

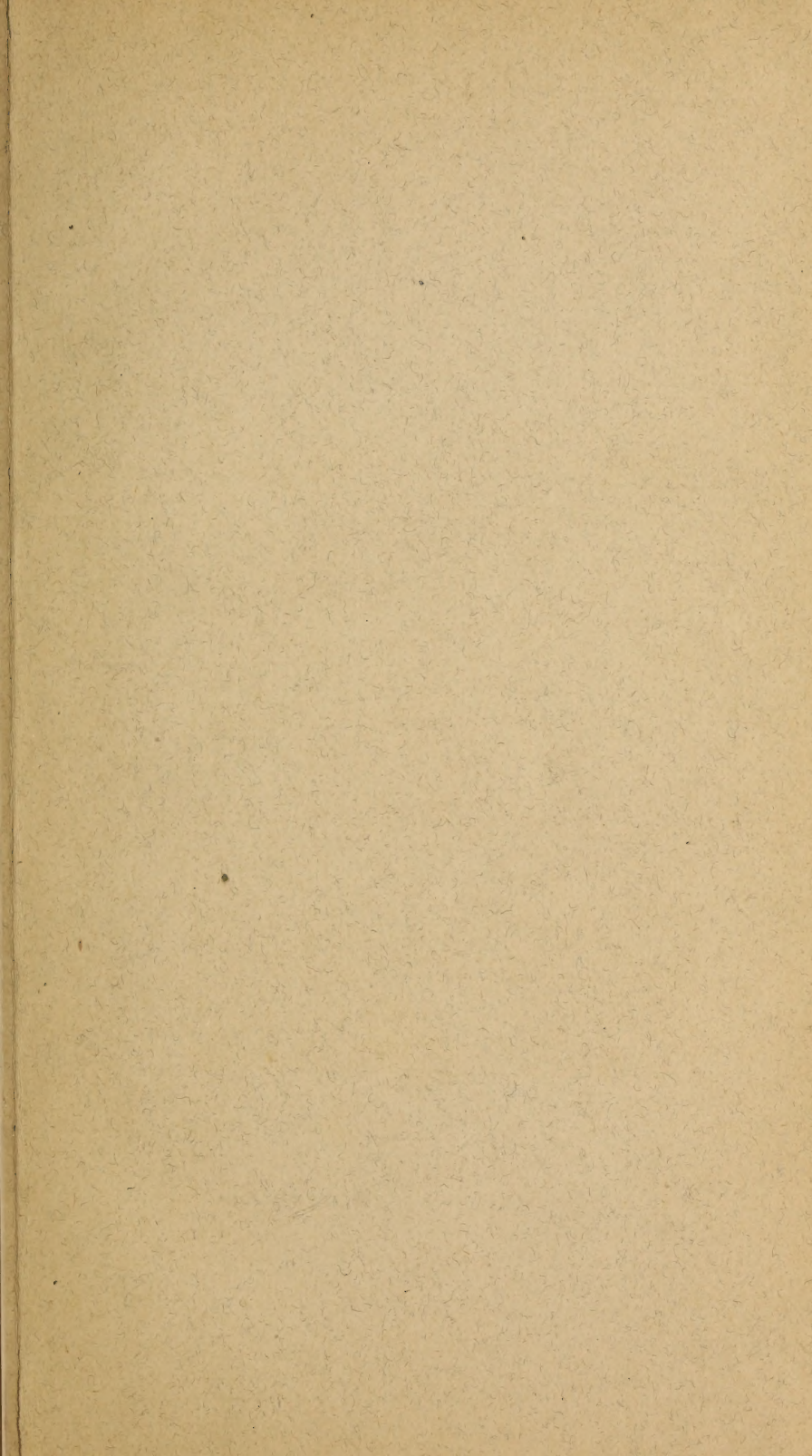
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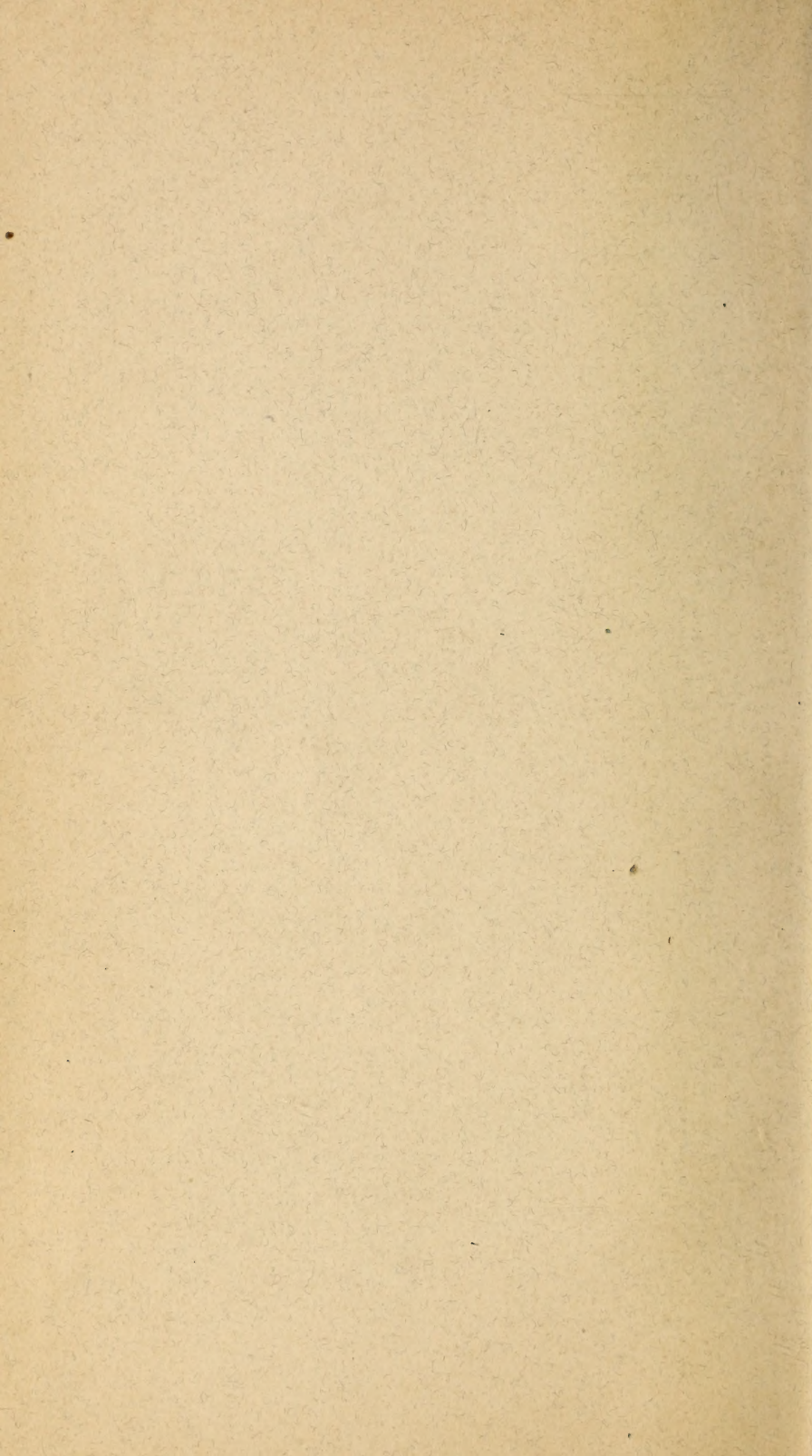


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THE Mosses collected during the expeditions for the survey of the 49th Parallel owe their principal interest to the specimen gathered by Dr. Lyall on the west side of the Rocky Mountains and in Vancouver Island, and these contain certain species which appear to be peculiar to that region, all the species from the country on the east side of the Rocky Mountains having been previously gathered by Drummond. Considering the vast extent of British America with regard to the specimens in herbaria, it becomes at once evident that but very little is yet known of its Moss-flora beyond the fact that it is very nearly identical with that of the north of Europe, and, so far as known, with but few peculiar species. A great gap exists in British herbaria in the almost entire absence of collections from all that extensive tract of country between Davis's Straits, Hudson's Bay, and Nova Scotia; and as this includes a great extent of regions subject to marine influences, it must be expected to produce a very extensive series of species.

In the United States, chiefly owing to the zealous labours of Sullivant, the knowledge of the productions of the parts investigated by him and his coadjutors has been greatly increased; but the country is so extensive, and there remains such an unexplored region in the south, where the northern forms become exchanged for those of tropical regions, which may probably be better observed there than anywhere else, that it is to be expected that great additions have yet to be made before the Bryology of the United States is approximately exhausted. Besides the species actually collected during the survey, there have been added a few others, either overlooked or not before determined, mostly collected by Drummond.

The arrangement of the species contained in the following enumeration is different from that employed in the 'Musci Indici,' in which the pleurocarpous genera were arranged approximately in the order in which the substance of the leaves became more and more indurated and obscure; and the whole of the Hypnoid mosses were divided into two sections by the nerves of the leaves, those with a single nerve being considered species of *Hypnum*, and those with two nerves or more were referred to Bridel's *Stereodon*. But although this plan serves very well to break up the tribe into two sections, there occur here and there species which may sometimes answer to one and sometimes to the requirements of the other section; examples of this occur in the species grouped in *Limnobium*, Schimper, in *Isoetecium*, and in *Hylocomium*, and are probably overlooked in many species; for in some the leaves of the main stem are faintly

two-nerved, and strongly one-nerved in the ultimate ramuli. Notwithstanding, however, the difficulty of defining the distinctions between the groups of Hypnoid mosses, Bridel's original group *Stereodon*, although incompletely viewed by him, may be said to differ from the *Hypna* of his arrangement in the more cylindric, less indurated capsule and short operculum, and in the habit of the species being somewhat different, the apices of the stems not usually descending and rooting in a proliferous manner as is the case with the *Hypna*. The mode of growth of the greater number of mosses is very little understood; for the comparison of a number of plants of the more abundant species, such as *Hypnum rutabulum*, Linn., will show that the habit assigned to *Rhynchostegium*, *Eurynchium*, and *Scleropodium* of Schimper is found in that species as well, and that the stem may be rooting its whole length, or erect and arcuate, or even subdendroid; and as all are equally fertile, one cannot be said to be less perfect than another. In the group *Stereodon* a number of aquatic species become erect in their mode of growth, from, as it would appear, their inability to increase in any other direction from the crowding of the stems together. In the 'Musci Indici' there was confused with the section *Stereodon* all that extensive group of species, chiefly tropical, which have distinct alar cells, generally three more distinctly conspicuous in each angle of the leaf, and a rostrate operculum; and these form another section or genus, *Sematophyllum*, which passes through a number of forms analogous to those of *Hypnum* and *Stereodon*.

In all arrangements of the Order Musci, up to the latest in M. Schimper's Synopsis (1860), the peristome is taken as the chief distinguishing character, and genera have been founded, and are maintained, upon characters dependent upon differences of which the value has been greatly overestimated; and even the straightness or curvature of the capsule is considered sufficient to constitute a distinct genus, and thus species are removed from proximity to those to which in every other particular they are so intimately allied as to be, in several cases, almost undistinguishable. Prominent examples of this occur in the *Trichostoma* as here understood, in which there is a regularly ascending series from *Pottia* through *Anacalypta* into *Desmatodon*; and as all these stages of development do occasionally occur in specimens of the same species, the conclusion seems unavoidable that the definition of a single genus should be sufficiently wide to contain them all. Very nearly the same position is occupied by the

species of the genus *Trichostomum* allied to *T. flavovirens* in respect of *Tortula*: taking for the typical species *T. tortuosa*, the only difference is in the shorter teeth of the peristome, the structure being identical. The same analogies exist in the development of the peristome of the pleurocarpous mosses, as, for example, in the capsule and peristome of the so-called genera *Homalothecium* and *Camptothecium*. In the species contained in these genera, the resemblance between the plants without the fruit is so great that it requires an expert bryologist to distinguish them from each other. The same is the case with *Pylaiesia*, which without fruit or inflorescence could hardly be known from *Hypnum cupressiforme*. It would seem, therefore, that a natural group of Mosses can only be defined from the structure of the species in which the highest development is found. All those species which agree in all other respects, as habit, ramification, position of the fruit, form, and substance of the leaves, but present a less development of peristome, should be considered as only affording a negative difference, of barely specific value. There would appear to be no escape from this conclusion among the acrocarpous genera; and as there is no difference in the structure of the peristome in the pleurocarpous, it must be applicable to the whole group of Arthrodontoid mosses.

MUSCI.

DICRANACEÆ, *Mitten, Musci Ind.*CYNODONTIUM, *Hedw.*(*Distichium*, B. et S.)C. CAPILLACEUM, *Hedw.*

Hab. Near Fort Ellice, Saskatchewan, and Rocky Mountains, *Bourgeau*;
Cascade Mountains, *Lyll*.

C. INCLINATUM, *Hedw.*

Hab. Saskatchewan, *Bourgeau*.

(*Leptotrichum*, *Hampe*.)C. FLEXICAULE, *Schw.*

Hab. Cascade Mountains, *Lyll*.

(*Dicranella*, *Schimp*.)C. CRISPUM, (*Dicranum*) *Hedw.*

Hab. Galton Mountains, *Lyll*.

C. SUBULATUM, (*Dicranum*) *Hedw.*

Hab. Galton Mountains, *Lyll*.

C. HETEROMALLUM, (*Dicranum*) *Hedw.*

Hab. Cascade Mountains, *Lyall.*

The genus *Cynodontium* of Hedwig, as described in the 'Species Muscorum,' contains, besides *C. capillaceum* and *C. inclinatum*, two other species which have long since been removed to other genera; and although *Distichium*, applied by Schimper to the two species with distichous leaves, is more expressive so far as relates to them in particular, yet it seems hardly possible to maintain a genus solely on this character, much less a natural family *Distichiæ*, when there is no appreciable difference in form or structure from the species allied to *Cynodontium flexicaule*, Schw., and the numerous species which agree with it in structure and habit. These, separated by Hampe from the other mosses usually referred to the genus *Trichostomum*, have been of late placed in the genus *Leptotrichum*, Hampe; recently, however, it has been pointed out by Lindberg that this name was already in use for a genus of Fungi, and he proposed instead of *Leptotrichum* the name *Diaphanophyllum*, Lindbg.; but on looking back in the history of the species it would appear that there is no reason why Hedwig's genus, considered as it must have been by Schwägrichen when he added *C. flexicaule* to it, should not be reinstated. The generic name *Trichostomum*, under which a number of species referable to *Cynodontium* have been arranged, cannot be employed, for reasons which will be stated elsewhere. If it be granted that the *Dicranaceæ* are a group of species of which the genus *Dicranum* is the typical form, and which may contain a series of progressive developments from *Archidium* through *Pleuridium*, *Bruchia*, *Garckea*, into *Cynodontium*, the place of the last-named genus must be very close to *Dicranum*, and its only difference the absence of distinct alar cells. No generically distinctive character can be drawn from the peristome, which in point of structure is alike in all the species of the family, and attains its highest known development in *Dicranum*. The structure of the leaves is nearly the same in all, excepting in the genera *Didymodon* and *Holomitrium*, in which the cells become shortened in the upper portions and thus approach to the *Trichostoma*. The aggregation of the cleistocarpous genera *Archidium* and *Pleuridium* in the same group of genera with *Dicranum* is a breaking up of the old idea of a separate family for the Phascoid mosses; but it may be observed that the sole difference between *Pleuridium* and *Cynodontium* is the absence of a deciduous operculum; and that all the other Phascoid genera are referable to other more highly developed families is

evident from the close affinity among those belonging to the *Trichostoma*.

Overlooked amongst Drummond's specimens is

C. CANADENSE. Dioicum?, caule brevi simplici, foliis e basi erecta subquadrata superne latiore vaginante subulato-lanceolatis divaricatis, nervo percurrente valido, marginibus serrulatis, cellulis basi elongatis inde suboblongis marginalibus brevioribus omnibus pellucidis, perichætialibus parum majoribus conformibus, theca in pedunculo elongato rubro turbinata inæquali, ore magno, dentibus validis rubris dicranis.

Hab. British N. America (probably from the Rocky Mountains), *Drummond*, no. 101 part.

In colour and appearance like a small state of *C. squarrosus*, (*Dicranum*) Schrad. Stems two or three lines high; seta about half an inch long or more. The leaves are pellucid, and differ from those of *C. squarrosus* in the more subulate narrower points and serrulate margins. This forms the third known species, corresponding closely with *C. squarrosus*—the Indian *C. patulum*, (*Leptotrichum*) Mitten, having leaves of the same outline, but serrulate, and, so far as can be seen, it is of a smaller size.

No species of *Archidium* has yet been noticed from British North America. Several occur in the United States, and the following appears to have escaped notice.

ARCHIDIUM, *Brid.*

A. TENERRIMUM. Foliis lanceolatis subserratis nervo excurrente, cellulis elongatis laxis, perichætialibus e basi ovali subulato-lanceolatis, florentia fructuque *A. phascoidis*.

Hab. Louisiana, *Drummond*, 2. no. 11 (as *A. phascoides*).

In the decidedly excurrent nerve and very lax areolation of the leaves this species is certainly distinct from *A. phascoides*, *Brid.* *A. Ohioense*, *Sullivant*, to which it is also closely allied in habit and general appearance as well as in the excurrent nerve, has its antheridia in distinct flowers, and the cells of its leaves not quite half so long and more close and firm.

DICRANUM, *Hedw.*

D. STRICTUM, *Schleich.*

Hab. Fort Colville, *Lyall*. Gathered also in British America by *Drummond*; Lake Huron, *Todd*; and in the United States by *Cooley*, and near Boston, *Green*. It is not enumerated by *Sullivant*.

D. FLAGELLARE, *Hedw.*

Hab. Fort Pitt, Saskatchewan, *Bourgeau*.

D. FUSCESCENS, Turner.

Hab. Cascade Mountains and Galton Mountains, *Lyall*; Winnipeg, *Bourgeau*.

D. PALLIDUM, B. et S.

Hab. British Columbia, *Lyall*. Gathered also in N.W. America by *Douglas* and *Seemann*. It appears to be generally distributed in N. America.

D. SCOPARIUM (Linn.).

Hab. British Columbia, *Lyall*; N.W. America, *Seemann*; Columbia, *Douglas*. It occurs as far north as Baffin's Bay, but according to *Sullivant* is less common than the preceding in the United States.

D. PALUSTRE, La Pyl.

Hab. Pend Oreille River and Semihamoo Bay, *Lyall*; Vancouver Island, *Wood*; Lake Winnipeg, *Bourgeau*. Generally distributed.

D. UNDULATUM, Turner. D. polysetum, Sw.

Hab. Saskatchewan, *Bourgeau*.

D. DRUMMONDII, C. Müller.

Hab. Saskatchewan and Portage de la Prairie, Lake Winnipeg, *Bourgeau*.

D. SCHRADERI, Schw.

Hab. Saskatchewan, *Bourgeau*.

D. LONGIFOLIUM, Hedw.

Hab. Portage de la Prêre, Lake Winnipeg, *Bourgeau*.

D. enerve, Thed. (*D. albicans*, B. et S.), was gathered by *Douglas* in N.W. America.

HOLOMITRIUM, Brid.**H. CIRRHATUM, (Weissia) Hedw.**

Hab. Vancouver Island and British Columbia, *Lyall*. Collected *Douglas* in N.W. America.

H. CRISPULUM, (Weissia) Hedw.

Hab. Galton Mountains and near Fort Colville, *Lyall*.

DIDYMODON, Hedw.

(*Amphoridium*, Schimp.)

D. LAPPONICUS, (Gymnostomum) Hedw.

Hab. Cascade Mountains, *Lyall*.

D. CÆSPITOSUS, sp. nov. *D. Mougeotii* habitu staturaque simillimus, foliis e basi erecta patentibus apice incurvo erectis sensim acutis remote serrulatis, cellulis basi oblongis rectangularis, deinde in ovoideas et superne in rotundatas transeuntibus.

Hab. Vancouver Island, *Lyall*.

In pale-green tufts, to all external appearance like *D. Mougeotii*, (*Amphoridium*) Schimp., but leaves gradually narrowed into an acute point, and the margin remotely serrulate as in *D. cyathicarpus*, (*Zygodon*) Mont.; the cells of the base of the leaf are not linear and narrow as in that species.

All the above-named species are regarded by me as imperfectly peristomate forms of *Rhabdoweissia*, Schimp., which is itself composed of species passing into the complete forms observable in *D. polycarpus*, *D. virens*, and *D. Wahlenbergii*.

(*Ceratodon*, Brid.)

D. PURPUREUS (Linn.).

Hab. Lake Winnipeg, *Bourgeau*; Cascade Mountains, British Columbia, and Vancouver Island, *Lyll*.

(*Oncophorus*, Brid.)

D. POLYCARPUS, (*Dicranum*) *Ehrh.*

Hab. Cascade Mountains, *Lyll*; Saskatchewan, *Bourgeau*.

D. VIRENS, (*Dicranum*) *Hedw.*

Hab. Galton Mountains, alt. 6000-7000 feet; British Columbia, *Lyll*.

D. WAHLENBERGII, *Brid.*

Hab. Saskatchewan, *Bourgeau*.

No species of *Didymodon* of the section *Leptodontium*, Hampe, has yet been received from British N. America; but the *Syrrhopodon excelsus*, Sullivant, referred by Müller to *Zygodon*, appears to be a slender state of a species which has been sent in a fertile state from Mexico, and corresponds nearly with the description of *Trichostomum ulocalyx*, C. Müller.

GRIMMIACEÆ.

GRIMMIA, *Ehrh.*

(*Scouleria*, Hook.)

G. SCOULERI, C. Müller.

Hab. On stones in the Columbia River, Fort Colville, *Lyll*.

(*Schistidium*, Brid.)

G. APOCARPA (Linn.).

Hab. Rocky Mountains, *Bourgeau*; Cascade Mountains and Fort Colville, *Lyll*; N.W. America, *Douglas*.

Generally distributed in British N. America; and from the numerous specimens brought by Mr. Taylor from Davis's Straits, it would appear to be abundant in that region. Amongst his

specimens there occurred a few of what appears to be a different species:—

G. PLATYPHYLLA. Foliis incurvis imbricatis late ovatis apice obtusis apiculove brevi diaphano terminatis marginibus revolutis nervo in apice evanido, foliis perichætalibus late ovali-oblongis apice obtuse angulatis, cellulis elongatis teneris fere ad apicem usque areolatis, theca immersa; cætera *G. apocarpæ* similis.

Hab. Davis's Straits, *Taylor*.

In habit, colour, and general appearance agreeing with *G. apocarpa*, var. *stricta*; but its leaves are more than twice as wide, and both in the wet and dry state imbricated; in their substance and areolation they agree exactly with those of *G. apocarpa*, and the capsule and peristome appear precisely the same; the perichætal leaves are very laxly areolate for two-thirds of their length. The specimens, from their very wide leaves, are immediately distinguishable from all known varieties of *G. apocarpa*.

(*Eugrimmia*, C. Müller.)

G. LEUCOPHÆA, *Grev.*

Hab. Fort Colville, *Lyll*.

Rather more slender than European specimens.

G. ALPESTRIS, *Schleich.*

Hab. Fort Colville and Pend Oreille River, *Lyll*.

All the specimens very dark green, but not otherwise differing from European ones.

G. PULVINATA (*Linn.*).

Hab. Fort Colville, *Lyll*.

G. TRICHOPHYLLA, *Grev.*

Hab. Vancouver Island, *Lyll*.

G. PATENS, (*Bryum*) *Dicks.*

Hab. Between Fort Colville and the Rocky Mountains, *Lyll*.

(*Dryptodon*, *Brid.*)

G. ACICULARIS, *Linn.*

Hab. British Columbia, *Lyll* and *Douglas*.

The capsule in some specimens elongated; but in other particulars like the European moss.

(*Rhacomitrium*, *Brid.*)

G. HETEROSTICHA, (*Trichostomum*) *Hedw.*

Hab. Fort Colville and Pend Oreille River, *Lyll*.

G. VARIA, sp. nov. *G. fasciculari* simillima, sed major, foliis ovato-lanceolatis apice obtusis vel (superioribus) pilo brevi subintegerrimo, nervo percurrente, marginibus recurvis, cellulis basi ad latera paucis oblongis rectangulatis interioribus elongatis confluentibus crenulatis supra folii medium oblongis parietibus transversis distinctioribus supermis quadrato-rotundatis, perichætalibus brevibus late ovatis convolutis, theca in pedunculo elongato cylindracea nitida, operculo subulato subæquilongo, peristomio dentibus rubris prælongis angustis.

Hab. British Columbia, *Lyall and Douglas*; and also in Observatory Inlet.

Much more robust than *G. fascicularis*, and with short diaphanous points on some of its upper leaves. The leaves are below of an oblong-ovate form, the upper third constituting the lanceolate point; in this particular they are intermediate in outline between those of *G. fascicularis* and *G. canescens*, wanting, however, the laxly areolate auricles at the base in the latter. This moss needs further observation; but it can scarcely be considered a form of *G. fascicularis*.

G. CANESCENS (Dill.).

Hab. Vancouver Island, *Lyall*.

G. LANUGINOSA, Dill.

Hab. Vancouver Island, *Wood*.

No species of *Glyphomitrium*, Bridel, has yet been received from British Columbia; but amongst Drummond's incomplete specimens there occurs a small species which has never been described.

GLYPHOMITRIUM, *Brid.*

G. CANADENSE, sp. nov. Monoicum, humile, foliis lanceolatis sensim acutis, margine inferne recurvo, cellulis basi oblongis ad angulos angustatis inde in rotundas transeuntibus, perichætalibus latissime ovatis convolutis breviter apiculatis, theca in pedunculo bilineari ovali, calyptra apice rugosa, habitu *G. Daviesii* simillimum.

Hab. British N. America, *Drummond*.

The oval capsule and different areolation of the leaves readily distinguish this from *G. Daviesii*, which in size and appearance it much resembles. The operculum and peristome are absent.

BARTRAMIACEÆ, *Mitten*.

PHILONOTIS, *Brid.*

P. FONTANA, Linn.

Hab. Rocky Mountains, *Bourgeau*; Chilukweyuk and Fort Colville, *Lyall*.

BARTRAMIA, *Hedw.**B. MENZIESII*, *Turner.**Hab.* Vancouver Island, *Lyall.**B. POMIFORMIS* (*Linn.*).*Hab.* Pend Oreille River and Sumass Prairie, *Lyall.**B. ITHYPHYLLA*, *Brid.**Hab.* Cascade Mountains and Rocky Mountains, *Lyall.**B. CÆDERI* (*Gunn.*). *B. gracilis*, *Schw.**Hab.* British Columbia near the 49th parallel, *Lyall.*MEESIA, *Hedw.**M. ULIGINOSA*, *Hedw.**Hab.* Mooyie River (a branch of the Kootenay), *Lyall.**M. TRISTICHA*, *Funk.**Hab.* Pack River, *Lyall.*FUNARIACEÆ, *Mitten.*FUNARIA, *Schreb.**F. HYGROMETRICA* (*Linn.*).*Hab.* Saskatchewan, *Bourgeau*; Fort Colville, Sinyakwateen, and Vancouver Island, *Lyall.*SPLACHNACEÆ, *Mitten.*TAYLORIA, *Hook.**T. SERRATA*, (*Splachnum*) *Hedw.**Hab.* Fort Colville, *Lyall.*

Splachnum melanocaulon, *Schw.*, has been several times brought from Western N. America; and some specimens collected on the Rocky Mountains by Mr. Burke show an extraordinary variation in the capsules, which in some specimens are as figured by Schwägrichen, and in others varying in the length of the seta until the capsule is only just exerted beyond the leaves, and with or without an umbraculum.

BRYACEÆ, *Mitten.*WEBERA, *Hedw.**W. NUTANS*, (*Bryum*) *Schreb.**Hab.* Saskatchewan, *Bourgeau*; Cascade Mountains and Galton Mountains, *Lyall.**W. CRUDA*, (*Bryum*) *Schreb.**Hab.* Fort Colville and Cascade Mountains, *Lyall.*

W. LONGICOLLA, (Bryum) *Sw.*

Hab. Cascade Mountains, *Lyall.*

W. ALBICANS, *Wahl.*

Hab. Galton Mountains, *Lyall.*

W. LUDWIGII, (Bryum) *Spreng.*

Hab. Cascade Mountains, *Lyall.*

W. PYRIFORMIS (*Linn.*).

Hab. Saskatchewan and Rocky Mountains, *Bourgeau*; Cascade Mountains, *Lyall.*

BRYUM, *Dill.*

B. ARCTICUM, (Pohlia) *Brown.*

Hab. Rocky Mountains, *Bourgeau.*

B. PURPURASCENS, (Pohlia) *Brown.*

Hab. Rocky Mountains, *Bourgeau.*

B. ULIGINOSUM, *B. et S.*

Hab. Rocky Mountains, *Bourgeau.*

B. BROWNII, *B. et S.*

Hab. Rocky Mountains, *Bourgeau.*

B. CÆSPITICIUM, *Linn.*

Hab. Saskatchewan, *Bourgeau*; Pack River, Cascade Mountains, Kettle Falls, and Galton Mountains, *Lyall.*

B. PALLESCENS, *Schleich.*

Hab. Cascade Mountains, *Lyall.*

B. BIMUM, *Schreb.*

Hab. Saskatchewan and Rocky Mountains, *Bourgeau*; Fort Colville and Galton Mountains, *Lyall.*

B. PSEUDOTRIQUETRUM, *Hedw.*

Hab. Rocky Mountains, *Bourgeau*; Fort Colville and Galton Mountains, *Lyall.*

B. DUVALII, *Voit.*

Hab. Fort Colville, *Lyall.*

B. TURBINATUM, *Hedw.*

Hab. Galton Mountains, *Lyall.*

B. CAPILLARE, *Linn.*

Hab. Vancouver Island, Pack River, and Galton Mountains, *Lyall.*

B. ARGENTEUM, *Linn.*

Hab. Rocky Mountains, *Bourgeau.*

ORTHOTRICHACEÆ, *Mitten.*

ORTHOTRICHUM, *Hedw.*

O. PALLENS, *Bruch.*

Hab. Pack River, British Columbia, *Lyall.*

O. STRANGULATUM, Beauv.

Hab. Cascade Mountains, British Columbia, *Lyall*.

O. ANOMALUM, Hedw.

Hab. Saskatchewan, *Bourgeau*.

O. SPECIOSUM, Nees.

Hab. On rocks near Fort Colville, *Lyall*.

O. ELEGANS, Schw.

Hab. Pend Oreille River, and between that and Kootenay River, British Columbia, *Lyall*.

The smooth capsule and rather more slender habit seem to be the only differences between this and the preceding; both forms are found in Europe.

Very large specimens of what appears to be the same as the European *O. Lyellii*, Hook., were gathered by Menzies on the N.W. coast of America, and were marked by Sir W. Hooker "*O. Menziesii*," but were never published; there is a great difference in the external look of the specimens, but no appreciable distinction.

O. CONSIMILE. Monoicum, pulvinatum, humile, foliis patentibus e basi ad insertionem angusta inde dilatatis ovato-lanceolatis nervo carinatis, marginibus recurvis reflexisque, cellulis basi paucis oblongis quadratisque superioribus rotundatis, perichætialibus conformibus, theca in pedunculo brevi exserta ovali siccitate plicata, operculo conico acuminato brevirostro, peristomio dentibus 8, ciliis simplicibus æquilongis 8 interpositis, calyptra plicata ramentosa.

Hab. Vancouver Island, on trees, *Lyall*.

Closely resembling *O. Columbicum*, but with shorter leaves. It is also allied to *O. pulchellum*, Sm., a species of which the position has not been well understood, it being sometimes placed in *Ulota*; but it agrees with the smaller species which correspond nearly with *O. speciosum*, Nees, and is truly an *Orthotrichum*.

O. COLUMBICUM. Monoicum, pulvinatum, humile, foliis e basi brevi oblonga erectiore longe lanceolatis patentibus apice latiuscule acutis nervo percurrente carinatis, marginibus reflexis, cellulis basi paucis elongatis superioribus subrotundis, perichætialibus brevibus, theca in pedunculo brevi exserta ovali-cylindræa siccitate plicata, peristomio dentibus 8, ciliis æquilongis 8 simplicibus alternantibus, calyptra plicata apice rugosa nuda.

Hab. Vancouver Island, on trees, *Lyall*.

In general appearance similar to *O. Tasmanicum*, Hook. f. et Wils., but rather less.

Amongst the American *Orthotricha* there occur several species which appear to have been overlooked, or to have been passed over as states of European species, but which on comparison do not appear to be identical with any previously known; of these are—

O. PARVULUM. Monoicum, humillimum, foliis patentibus elliptico-lanceolatis sensim acutis acuminatisque nervo carinatis, marginibus vix recurvis, cellulis basi ad angulos alares paucis oblongis fuscis, cæteris omnibus rotundatis, perichætialibus basi latioribus, theca immersa obovata plicata, peristomio dentibus 16, calyptra plicata ramentosa.—*O. Sturmii*, Sullivant.

Hab. Prope Santa Fe Neo-Mexicanorum, *Wright*, et in Novæ Angliæ alpidibus, *Oakes*.

Very different from *O. Sturmii*, Hsch. et Hoppe, and in its foliage more like *O. tenellum*, Bruch.

O. PUSILLUM. Monoicum, brevissimum, foliis patentibus ovato-lanceolatis, inferioribus acutis, superioribus late acutatis obtusiusculis nervo carinatis, marginibus reflexis, cellulis basi quadratis pellucidis, superioribus rotundatis granulosis, perichætialibus interioribus brevioribus, theca immersa obovata siccitate 8-plicata leptoderma, peristomio dentibus 16 brevibus.

Hab. Pennsylvania, *Drummond*.

Less than *O. tenellum*, and with a very thin, short, pale capsule, and foliage more rigid than in *O. parvulum*.

O. COULTERI, sp. nov. Monoicum, habitu staturaque *O. tenelli*, foliis densis e basi erectiore subovali angustatis lanceolatis patentibus, apicibus latiusculis obtusiusculis subacutis, marginibus recurvis, nervo sub apice evanido carinatis, cellulis basi in folii medio paucis oblongis elongatisque latioribus, inde ad apicem abbreviatis quadratis rotundisque distinctis papillois, perichætialibus erectioribus latioribus elliptico-lanceolatis acutioribus, vaginula ramentis elongatis pilosa, theca emersa ovali-cylindracea octies plicata in pedunculo sensim angustato, peristomio dentibus ciliisque tertia parte brevioribus angustis 8, calyptra ramentis brevibus appressis obtecta.

Hab. California, *Coulter*.

Very similar in appearance to *O. tenellum*, Bruch, but its capsules exerted beyond the apices of the perichætial leaves, which are more acute, its calyptra more pilose, its cilia short, and its male flowers larger.

The description of *O. cylindrocarpum*, Lesq., in which the peristome is stated to be "dentibus externis pallidis, ciliolis robustis longioribus albidis articulatis," and the calyptra "valde pilosa," indicates another nearly allied Californian species.

O. CANUM. Humile, foliis patentibus elliptico-lanceolatis nervo carinatis, marginibus recurvis reflexisque, apicem versus plus minus erosulis apice diaphanis, superioribus pilo brevi hyalino fragili terminatis, cellulis basi paucis oblongis quadratisque, inde ad apicem rotundatis granulosis grossiusculis, perichæcialibus ovatis subacutis, theca emergente ovali-cylindræa plicata, operculo breviter acuminato, peristomio dentibus bigeminatis ciliis subulatis basi e serie duplici cellularum compositis interpositis, calyptra totam fere thecæ obtegente breviter ramentosa.

Hab. British N. America, *Drummond*.

Different from *O. diaphanum*, Schrad., in the form of its leaves, and in appearance more nearly like *O. pumilum*, Schw., which has differently shaped leaves, also tipped with a minute hyaline fragile mucro.

ULOTA, *Brid.*

U. PHYLLANTHA, *Brid.*

Hab. Vancouver Island, *Wood*.

U. AMERICANA. Monoica, foliis siccitate tortis appressis e basi sub-ovali longe lanceolatis sensim acutis nervo carinatis, marginibus recurvis, sæpe suberosis, cellulis basi ad margines seriebus circiter tribus hyalinis oblongis, in medio angustis luteis, superioribus rotundatis diametro circiter $\frac{1}{4000}$ unciae metientibus, perichæcialibus apice latioribus obtusiusculis, theca elliptica plicata, operculo conico acuminato, peristomio dentibus bigeminatis 8, ciliis æquilongis angustis 8, calyptra breviter appresse ramentosa.

Hab. Lake Huron, *Todd*; British N. America, *Drummond*, no. 153, with *U. Bruchii* as *U. crispa*.

Differs from *U. curvifolia*, Wahlenb., in the areolation of the base of the leaf, and from *U. crispa*, Hedw., and *U. crispula*, Hsch., in the same particular, as well as in the form of the base of the leaves. The space of a thousandth part of an inch in the middle of the lanceolate part of the leaves contains in *U. crispa* two cells, in *U. crispulum* two and a half, in *U. Americana* three cells.

U. BARCLAYI. Monoica, cæspitosa, humilis, foliis patentibus siccitate appressis e basi excavata subrotundata late lanceolatis acutis, superioribus acutatis, nervo carinatis, marginibus convexis integerrimis, cellulis basi ad lateras oblongis in seriebus pluribus hyalinis, interioribus paucis elongatis luteis, superioribus rotundatis diametro circiter $\frac{1}{3000}$ unciae metientibus, perichæcialibus ovato-lanceolatis convolutis erectis, theca ovali et collo crasso siccitate plicata, peristomio dentibus bigeminatis 8, ciliis 8 brevioribus interpositis, calyptra breviuscula breviter ramentosa.

Hab. Sitka, *Barclay*.

A very small pale yellowish species, in the older portions rusty. Unlike any other known North American *Ulot*a, having the leaves scarcely twisted when dry, and the very thick peduncle, which is the elongated neck of the capsule, when dry plicate, as well as the capsule itself, which is pale brown.

TRICHOSTOMACEÆ, *Mitten*.* *Tortulæ*.HYMENOSTYLIUM, *Brid*.*H. CURVIROSTRE*, (*Gymnostomum*) *Hedw*.*Hab.* Rocky Mountains, *Bourgeau*.*BARBULA*, *Hedw*.

B. RUBIGINOSA. Dioica, *B. vineali* habitu staturaque affinis, foliis siccitate appressis curvatis, humidis patentibus, inferioribus ovatis, superioribus e basi ovata ad insertionem angustata angulis decurrentibus subulato-lanceolatis acutis, margine recurvo, nervo in apicem crassiusculum percurrente, cellulis minutis rotundatis subobscuris minute papillois, perichaetialibus erectis majoribus e basi elongato-ovali turgide laxè convoluta nervo excurrente subulato-apiculatis, theca in pedunculo rubro ovali-cylindræa erecta, operculo conico dimidio breviorè, annulo e triplici serie cellularum composito, peristomio nullo.

Hab. N.W. America, *Douglas*.

In the absence of peristome, allied to the East Indian *B. rufescens*; but the present is a rather larger species, with more subulate leaves, not so straight, and stiffly appressed when dry; they are also more contracted at the base.

B. RIGIDULA, (*Bryum*) *Dicks*.*Hab.* Vancouver Island, *Lyall*.

The specimens are too old and too young to show the peristome, but they appear to belong to this species.

B. FALLAX, *Hedw*.*Hab.* Rocky Mountains, *Bourgeau*.

A barren moss, but which appears to belong to this species.

B. insulana, De Notaris, usually confused with *B. vinealis*, *Brid*., was gathered in California by Beechey.

B. RUBELLA, *Roth*.*Hab.* Rocky Mountains, *Bourgeau*.*TORTULA*, *Schreb*.*T. TORTUOSA*, *Linn*.*Hab.* Rocky Mountains, *Bourgeau*.

T. CORNICULATA, (Trichostomum) *Wahl.* *Barbula anomala*, *Bryol. Europ.*

Hab. Vancouver Island, *Lyall.*

One or two stems only; it was gathered in California by Dr. Coulter.

**** *Syntrichia*.**

PHASCUM, *Linn.*

P. CUSPIDATUM, *Schreb.*

Hab. Fort Colville, *Lyall.*

DESMATODON, *Brid.*

D. CAVIFOLIUS, (Pottia) *Ehrh.*

Hab. Fort Colville, *Lyall.*

D. HEIMII, (Gymnostomum) *Hedw.*

Hab. Saskatchewan, *Bourgeau.*

D. LATIFOLIUS, (Dicranum) *Hedw.*

Hab. Cascade Mountains, *Lyall.*

D. MUCRONIFOLIUS, (Tortula) *Schw.*

Hab. Rocky Mountains, *Bourgeau.*

SYNTRICHIA, *Brid.*

S. PRINCEPS, *De Not.* *Barbula Mülleri*, *B. et S.*

Hab. Vancouver Island, *Lyall.*

Some of the specimens very fine, and much larger than European ones. This species is widely distributed, and in appearance is very variable.

If De Notaris's name has priority in publication, it ought to take precedence.

S. RURALIS, *Linn.*

Hab. Rocky Mountains, Cascade Mountains, Fort Colville, and Moyie River (a branch of the Kootenay), *Lyall.*

This species is generally present in collections from very high northern latitudes.

S. LÆVIPILA, *Brid.*

Hab. Vancouver Island, *Lyall.*

A short compact state, but not apparently different from the European form. M. Lesquereux makes the same remarks upon the Californian specimens sent to him.

S. papillosa, *Wils.*, has been sent from Boston intermixed with *Pterogonium intricatum*, *Hedw.*

ENCALYPTA, *Schreb.**E. CILIATA*, *Hedw.**Hab.* British Columbia, Cascade Mountains, and Fort Colville, *Lyall*.*E. VULGARIS*, *Hedw.**Hab.* Fort Colville, *Lyall*.*E. RHABDOCARPA*, *Schw.**Hab.* Rocky Mountains. Cascade Mountains, *Lyall*.

E. LONGIPES. Dioica?, caule brevi ramoso, foliis patulis concavis ambitu late ellipticis acutis paulo supra basin angustatis nervo percurrente obtuse carinatis, margine minute eroso, cellulis basi infima oblongis hyalinis inde viridibus mox abbreviatis quadrato-rotundatis papillois, perichætialibus parvis vaginulam vix superantibus latissime ovatis acutis, theca in pedunculo longissimo rubro ovato-cylindracea basi apophysata, operculo subulato subæquilongo, peristomio dentibus angustis elongatis, calyptra basi nuda apice lævi.

Hab. In a shaded place by the side of a rivulet, Rocky Mountains, *Drummond*.

Stems about three lines high, with many fastigiate branches. Foliage like that of *E. streptocarpa*, to which species *Drummond* himself referred the specimens. Leaves gradually dilated from a little above the pale base, the upper portion broadly elliptic. Seta an inch and a half long, slightly flexuose. Capsule too immature to show if it is furrowed. Male flowers not seen.

MNIACEÆ, *Mitten.*FISSIDENS, *Hedw.**F. ADIANTOIDES* (*Linn.*).*Hab.* Fort Colville, *Lyall*.*F. GRANDIFRONS*, *Brid.**Hab.* Sumass Prairie, British Columbia, *Lyall*.TETRAPHIS, *Hedw.**T. PELLUCIDA* (*Linn.*).*Hab.* Saskatchewan, *Bourgeau*; Fort Colville, *Lyall*.AUCOMNION, *Schw.**A. ANDROGYNUM* (*Linn.*).*Hab.* Vancouver Island and Fort Colville, *Lyall*.*A. PALUSTRE* (*Linn.*).

Hab. Saskatchewan and Rocky Mountains, *Bourgeau*; Cascade Mountains, *Lyall*.

MNIMUM, *Linn.*

M. INSIGNE, *Mitten.*

Hab. Vancouver Island, *Wood and Lyall*; British Columbia, *Lyall.*

M. MEDIUM, *B. et S.*

Hab. Pend Oreille and Pack Rivers, Fort Colville, and Cascade Mountains, *Lyall.*

M. AFFINE, *Bland.*

Hab. Saskatchewan and Rocky Mountains, *Bourgeau.*

M. VENUSTUM, *Mitten.*

Hab. Vancouver Island, *Lyall.*

M. CUSPIDATUM, *Hedw.*

Hab. Saskatchewan, *Bourgeau.*

M. SPINULOSUM, *B. et S.*

Hab. Fort Colville, *Lyall.*

M. UMBRATILE, sp. nov. Dioicum, foliis laxis patentibus, inferioribus minoribus oblongis ovalibusque plus minus acutis integerrimis marginatis, superioribus elliptico-oblongis apiculo parvo terminatis, basi longe decurrentibus, marginibus breviter duplicato-serratis, nervo percurrente, cellulis omnibus rotundatis parietibus grossiusculis, perichæatialibus pluribus interioribus brevioribus lanceolatis, exterioribus elongatis, caulinis angustioribus, theca in pedunculo pallide rubro horizontali oblongo cylindracea basi attenuata curvata, operculo pallido conico acuminato, cæterum *M. serrato* simillimum.

Hab. "Mountain Rocks, Second point of Wood, Portage River," *Drummond*; Galton Mountains, British Columbia, *Lyall.*

In appearance altogether like *M. serratum*, *Brid.*, and with foliage, as in that species, contorted and shrinking away when dry, but in its dioicous inflorescence allied to *M. orthorhynchum*, *Brid.*, which was mixed with *Drummond's* specimens of his *Bryum marginatum*, no. 259; differing, however, from this in its softer leaves with cells four times as large, and also from *M. riparium*, *Mitten* (*M. lycopodioides*, *Bryol. Europ.*), which has its cells only half as large, and the comal leaves long and narrow.

TIMMIA, *Hedw.*

T. MEGAPOLITANA, *Hedw.*

Hab. Vancouver Island and Galton Mountains, British Columbia, *Lyall*; Saskatchewan, *Bourgeau.*

T. AUSTRIACA, *Hedw.*

Hab. Cascade Mountains and Pack River, British Columbia, *Lyall.*

HYPNUM, *Dill.*(*Homalothecium et Camptothecium*, Schimp.)*H. NUTTALLII*, *Wils.**Hab.* Vancouver Island, *Lyall*; California, *Coulter*; N.W. Coast, *Douglas*.

In its capsule completely intermediate between *H. sericeum* and *H. lutescens*.

H. LUTESCENS, *Hedw.**Hab.* Vancouver Island, *Lyall*: collected also by *Douglas*.

Specimens very large, and capsule rather longer than in the common European form.

H. ÆNEUM, sp. nov. Dioicum, foliis inferne ovatis sensim lanceolato-acuminatis plicatis, nervo infra apicem evanido, marginibus reflexis remote serrulatis, cellulis basi ad angulos pluribus parvis abbreviatis obscuris, superioribus elongatis angustis, perichætialibus elongatis erectis late lanceolatis apice subito subulatis serrulatis enerviis, theca in pedunculo scabro cylindracea inclinata curvata, peristomio interno processibus angustis perforatis ciliis tribus subæquilongis interpositis in membrana ad tertiam dentum longitudinis exserta, habitu omnino *H. lutescenti* simile.

Hab. Pend Oreille River, British Columbia, *Lyall*.

A single fertile stem with two capsules and a few stems with male flowers are all that has been seen of this moss; it resembles *H. aureum*, Lagasc., in size and general appearance, but the leaves of the stems are not so deeply plicate, and the apices lanceolate and serrulate, not attenuated into a smooth hair-like point. In the apices of the lateral branches the leaves have their points broad, somewhat acutate, and obtuse; by this particular the specimens are readily distinguished from *H. lutescens* as well.

H. NITENS, *Schreb.**Hab.* Saskatchewan, *Bourgeau*; Pack River, British Columbia, *Lyall*.(*Ptychodium et Lescurea*, Schimp.)

H. RADICOSUM, sp. nov. Dioicum, intricate cæspitosum, foliis patentibus laxè imbricatis in apicibus ramorum subsecundis ovato-lanceolatis acuminatis concavis nervo percurrente, marginibus reflexis apice serrulatis, cellulis basi pluribus abbreviatis rotundatis, superioribus oblongis mollibus, paraphyllis parvis lanceolatis, perichætialibus magnis erectis convolutis elliptico-lanceolatis acuminatis, externis enerviis, internis ad medium tenuiter nervatis apice subserrulatis.

Hab. Banks of the Portage River, *Drummond*, no. 225 (*H. tenax*).

So far as can be seen in the incomplete specimens, which are

mixed with a fertile state of *H. uncinatam*, this species would appear to be a little larger than that found in the mountains of Switzerland and distributed by Schleicher as *Pterogonium striatum*, and since named by De Notaris *Lescurea insignis*; but in this the leaves are more concave.

The relative position of the species constituting the group known as *Lescurea*, Schimper, to *Ptychodium* ejusd. is precisely the same as that of *Pylaesia*, Schimp., to *Hypnum cupressiforme* and of *Homalothecium* to *Camptothecium* and *Brachythecium*, the sum of the differences being only in a more erect capsule and less perfect peristome—distinctions which may serve for the arrangement of the species, but can scarcely be admitted as of generic importance when considered by the light afforded by the very natural group *Plagiothecium* and *Amblystegium*, Schimp., and also by the modifications in the peristome of *Bryum*.

All the yet described species of *Lescurea* and *Ptychodium* agree in the substance of the leaves and in the presence of paraphylla.

(*Brachythecium*, Schimp.)

H. ALBICANS, Neck.

Hab. Rocky Mountains, *Bourgeau*.

H. SALEBROSUM, Hoffm.

Hab. Saskatchewan, *Bourgeau*; Fort Colville and Pend Oreille River, *Lyall*.

H. COLLINUM, *Schleich.*

Hab. Cascade Mountains, British Columbia, *Lyall*; collected also in British N. America by *Drummond*.

H. CEDIPODIUM, sp. nov. Monoicum, caule procumbente subpinnato ramis decurvis radicanibus, foliis late ovatis acuminatis, nervo medio evanido, marginibus serrulatis, cellulis oblongis elongatisque ad angulos decurrentibus pluribus quadratis, perichætialibus convolutis late ellipticis acuminatis apice serrulatis enerviis, theca in pedunculo crassiusculo sulcato minute scabro nutante ovali inæquali, operculo conico, peristomio normali ciliis duobus appendiculatis.

Hab. Lake Huron, *Todd*, and sent from the United States by *Cooley*; Pack River and Rocky Mountains, *Lyall*.

Stems loosely cæspitose. Leaves pale green and subcompressed, those of the ramuli more sharply serrulate; areolation soft and loose; cells generally chlorophyllose. In appearance this species has some resemblance to *H. Starkii*, and agrees with it in its thick seta and the appearance of the capsule; but the substance of the leaves is far different, and in drying they do not become striated.

H. DECLIVUM, sp. nov. Monoicum, caule procumbente subpinnato, foliis subfalcatis lanceolatis sensim acuminatis, nervo medio evanido, marginibus serrulatis, cellulis omnibus elongatis angustis, perichæticalibus e basi latiore recurvis enerviis, theca in pedunculo crassiusculo scaberrimo horizontali ovali inæquali, operculo conico, peristomio normali ciliis duobus appendiculatis

Hab. Pend Oreille River, on *Peltigera scutata* and *P. venosa*, *Lyall*.

A small, slender species, so nearly allied to *H. velutinum*, Dill., that it might be considered merely a variety, were it not for the very much thicker and more scabrous seta and the capsule, when old, pendulous.

H. ACUTUM, sp. nov. Monoicum, caule procumbente vage subpinnato, foliis patentibus compressis ovato-lanceolatis sensim a basi ad apicem acutum angustatis siccitate longitudinaliter plicatis, nervo paulo ultra medium evanido, marginibus superne remote serrulatis, cellulis basi brevibus oblongis inde ad apicem elongatis angustis, perichæticalibus e basi erecta ovali brevi nervata subulatis angustis subintegerrimis recurvis, theca in pedunculo elongato ovali inclinata inæquali, operculo conico brevi subulirostrato, peristomio normali.

Hab. Pack River, British Columbia, *Lyall*. Sent also from Boston by *Green*.

In size and general appearance very closely resembling some of the less robust states of *H. salebrosum*, but differing from this and nearly all the allied species in the form of its leaves gradually narrowed from just above the base to the apex and not acuminate, and in the operculum. In the compressed foliage and spreading habit not very dissimilar to some states of *H. riparium*, Dill.

H. ASPERRIMUM, sp. nov. Dioicum, caule procumbente ramis laxè subpinnatim ramosis, foliis ovatis sensim acuminatis striatis, nervo ultra medium evanido dorso denticulato, marginibus serrulatis basi anguste decurrentibus, cellulis ad angulos paucis brevioribus, superioribus elongatis angustissimis, perichæticalibus e basi ovata subulato-attenuatis recurvis breviter nervatis, theca in pedunculo elongato asperimo inclinata ovali, operculo conico acuminato, peristomio normali.

Hab. British Columbia, *Lyall and Douglas*.

A little more slender than the usual forms of *H. rutabulum*, Dill., and with leaves gradually narrowed to the apex, not contracted at the top of the ovate portion of the leaf, thence acuminate, the margins more strongly serrulate, and the nerve distinctly denticulate towards its apex.

*(Isothecium, Bryol. Europ.)**H. STOLONIFERUM*, Hook. *Musci Exot.* t. 74.*Hab.* Vancouver Island, Wood; British Columbia, Lyall; N.W. America, Menzies; Nootka, Barclay.

Leaves from the primary stem, where the perichætia are produced, ovato-lanceolate, serrulate, slightly plicate, those of the ramuli elliptic-lanceolate, minutely papillose on the back above the middle, nerve smooth, continuing to three-fourths of the length of the leaves. Perichætial leaves subulate, serrulate, and recurved, from an oblong, erect, faintly two-nerved base. Seta smooth. Peristome as figured. This fine species corresponds entirely in habit with the European *H. myosuroides*, Dill.

H. SPICULIFERUM, sp. nov. Foliis infra perichætium e basi cordato-ovata lanceolato-acuminatis nervo ad $\frac{3}{4}$ evanido dorso lævibus, marginibus inferne reflexis superne serrulatis, superioribus angustioribus dorso papillosis, ramulinis elliptico-lanceolatis acutissimis concavis dorso spiculoso papillosis, nervo versus apicem denticulato, marginibus planiusculis ubique serrulatis, perichætialibus e basi erecta oblonga ultra medium uninervatis subulatis serrulatis recurvis, theca in pedunculo breviusculo lævi oblonga subæquali horizontali, operculo conico, peristomio interno processibus perforatis, ciliis singulis æquilongis, in membrana ad tertiam dentium longitudinis exserta, habitu *H. myosuroides*.

Hab. British Columbia, Lyall and Douglas.

In habit similar to *H. myosuroides*, but the ramuli more attenuated and more curved, and the whole plant a little larger. It appears to differ from *H. stoloniferum* in its more slender habit, more abundant papillæ on its branch leaves, reflexed margin of its cauline leaves, the more strongly one-nerved perichætial leaves, and single cilium between the processes of the internal peristome.

H. ACUTICUSPIS, sp. nov. Foliis laxè imbricatis, infra perichætium late cordato-ovatis acumine angusto elongato marginibus tenuiter serrulatis apice cuspidis sublævi, nervo variante brevissimo, quasi disperso, furcato integrove medio evanido, cellulis ad angulos impressis infuscat, ramulinis ovali-ellipticis acutis serrulatis ad medium nervatis dorso lævibus, cellulis ad angulos fuscis, perichætialibus e basi oblonga enervia subulatis recurvis subintegerrimis, theca in pedunculo breviusculo ovali inclinata, operculo conico, peristomio interno processibus perforatis ciliis duobus brevioribus interpositis, habitu *H. stoloniferi*.

Hab. British Columbia, Douglas.

Two stems only have been seen of this apparently distinct species. In size it corresponds with *H. stoloniferum*; but its

leaves are much wider in proportion to their length, and loosely imbricated, so that the stems have a more terete appearance; the papillæ on the back of the leaves seem to be absent; the areolation agrees entirely with that of the preceding species, but the cells in the angles are more bossed out and coloured.

This may be *H. (Isothecium) Brewerianum*, Lesq., but its description is not sufficiently complete to be quite certain.

H. AGGREGATUM, sp. nov. Dioicum, caule primario repente, ramis erectis densissime aggregatis simplicibus parceve ramosis curvatis attenuatis, foliis inferioribus patentibus late hastato-ovatis acuminatis subnerviis sensim versus medium ramorum in late ovata, ultra medium nervata acuminata subjulacea imbricata transeuntibus, inde sensim minoribus argutiusque versus apicem serrulatis, nervo dorso apice dentiformi prominente, cellulis ad angulos pluribus minutis quadrato-rotundatis, superioribus brevibus oblongis pellucidis, perichæcialibus elongatis ovato-lanceolatis seminerviis apicibus serrulatis patulis, theca in pedunculo circiter semiunciali lævi inclinata cylindracea inæquali, operculo conico acuminato, peristomio interno processibus angustis, ciliis singulis dimidio brevioribus interpositis, in membrana ad dentium tertiam longitudinis exserta.

Hab. Vancouver Island, *Lyall*; British Columbia, *Douglas*.

Slightly glossy, pale green tinged with brown, growing in dense patches, with the erect stems closely packed together. The leaves, from their julaceous imbrication, give the smaller plants some resemblance to some states of *Pterogonium gracile*, but they are generally much thicker and shorter. Other stems with less imbricated leaves have a resemblance to *H. myurum*, with which the habit of the plant agrees.

H. APOCLADUM, sp. nov. Dioicum, caule procumbente apice descendente radicante ramis paucis subsimplicibus apicibus sæpe attenuatis decurvatis, foliis patentibus, in ramorum apicibus cuspidato-imbricatis, ovatis acutis nervo sub apice evanido integerrimis, in ramulis apicibus latioribus obtusioribus serrulatis, cellulis basi ad angulos pluribus quadrato-rotundatis subobscuris, superioribus oblongis parietibus teneris, perichæcialibus elongatis erectis ovato-lanceolatis acuminatis apice serrulatis ultra medium nervatis, theca in pedunculo elongato sublævi erecta suberectave ovali cylindracea, operculo convexo acuminato.

Hab. N.W. coast of America, *Douglas*.

In appearance not unlike some specimens of *H. acuminatum*, Beauv.; but the leaves are quite smooth, and the habit would appear to be different. The seta is very slightly rough, so slightly that its roughness is only seen when specially sought for. The peristome is broken in all the capsules.

H. LENTUM, sp. nov. Dioicum, foliis patentibus laxè imbricatis, in apicibus ramorum cuspidato-imbricatis, inferioribus latioribus brevioribus in ramorum medio ubi fructus proferunt late ovatis acumine brevi, in ramulis attenuatis ovato-lanceolatis apicibus latioribus obtusioribus, marginibus tenuiter in ramulinis argutius serrulatis nervo ultra medium evanido, cellulis basi ad angulos pluribus latioribus angustioribus immixtis parietibus crassiusculis, superioribus angustis, quasi apicibus dorso prominulis, in apice oblongis, perichætialibus enerviis e basi ovali amplexante subulatis recurvis subintegerrimis, theca in pedunculo unciali scabro ovali cylindræa suberecta inæquali, peristomio interno processibus solidis ciliis singulis subæquilongis in membrana ad dentium tertiam longitudinis exserta.

Hab. N.W. coast of America, *Douglas*.

Of this moss only a few fragments have been seen. It appears to be about the size of the common forms of *H. myurum*, but of a loose spreading habit.

At first it was supposed that this was only a state of *H. aplocladum*; but the decidedly rough seta and wider leaves, those of the perichætium spreading, render it distinct. The scabrous seta of this moss may be considered a new feature in the group of species to which it is here referred: but after a consideration of the characters which constitute the group *Isothecium*, it becomes evident that it cannot be defined distinctly from the groups named by Schimper *Brachythecium* and *Scleropodium*; for the habit, which is the most evident characteristic of *Isothecium*, is only more conspicuous among the species forming that group than it is in *Brachythecium*, in which it is essentially the same; and the only difference between these groups is the plication of the leaves, chiefly when dry, in the group *Brachythecium*, which in *Isothecium* and *Scleropodium* is less evident, and is thus a transition to the group *Rhynchostegium*, which have the leaves more smooth.

(*Eurhynchium*, Schimp.)

H. OREGANUM, *Sullivant*, in *U. S. Expl. Exped.* t. 13. *H. Douglasii*, *Hook. MS.*

Hab. British Columbia, near the 49th parallel, *Lyll*; Vancouver Island, *Wood*.

Some specimens of this noble species were more than a foot long.

H. PRÆLONGUM, *Dill.* *H. Stokesii*, *Turn.*

Hab. British Columbia, near the 49th parallel, *Lyll*; Vancouver Island, *Lyll and Wood*.

This much misunderstood species has a very wide distribution, and is found in the Andes.

H. STRIGOSUM, Hoffm.

Hab. Rocky Mountains, *Bourgeau*; Fort Colville and Galton Mountains, *Lyall*.

PTEROGONIUM, Sw.

P. BRACHYPTERUM, sp. nov. Monoicum, caule procumbente inordinato pinnato ramis abbreviatis, foliis imbricatis densis late deltoideo-ovatis acuminatis (acumine angusto) concavis, margine inferne plano superne minute subserrulato, nervo concolore paulo ultra medium evanido, cellulis ad angulos minutis rotundis, reliquis brevioroideis in apiculi apice elongatis, omnibus distinctis papillois, perichæcialibus erectis ovatis acuminatis nervo supra medium desinente integerrimis, cellulis elongatis areolatis teneris, theca in pedunculo elongato crassiusculo flavo ovali-cylindracea erecta æquali, operculo brevi conico, peristomio externo dentibus brevibus flavis infra os thecæ orientibus basi coalitis, interno carente, flore masculo gemmiformi majusculo.

Hab. British North America, *Drummond*.

Stems about one inch long. Seta half an inch high. In structure and appearance corresponding closely with the Abyssinian *P. abbreviatum*, (*Leskea*) Schimp. Quite distinct from any other North American moss.

(*Heterocladium*, Schimp.)

P. PROCURRENS. Dioicum, caule arcuato procumbente ramis inordinatis pinnato bipinnatove, foliis caulinis divergentibus compressis cordato-ovatis sensim in acumen piliforme attenuatis marginibus tenuiter serrulatis nervis binis inæqualibus medio evanidis, cellulis in folii medio elongatis margines apicemque versus oblongis, omnibus pellucidis lævibus, rameis ovatis asymmetricis apicibus obtusiusculis, perichæcialibus e basi late ovata convoluta apicibus patentibus, theca in pedunculo elongato ovali horizontali.

Hab. British N. America, *Drummond*.

Dull yellowish green. Stems three inches or more long, with branches varying from half to one inch in length. Seta one inch long. This species has a looser habit than the European *H. dimorphum*, Brid., and *H. Kurrii*, Sch., but agrees with them in all essential characters. It is the largest of all the species yet known.

HYLOCOMIUM, Schimp.*H. TRIQUETRUM*, Linn.

Hab. British Columbia, *Lyall and Douglas*; Juan de Fuca, *Seemann*.

H. LOREUM, Dill.

Hab. Vancouver Island, *Lyall and Wood*; British Columbia, *Lyall*; N.W. Coast, *Barclay*; Juan de Fuca, *Seemann*.

H. SPLENDENS, Dill.

Hab. Saskatchewan, *Bourgeau*; Vancouver Island, *Lyall* and *Wood*; British Columbia, *Lyall*.

Hypnum spectabile, Wils. MS., from Russian America, is probably *H. Ruthenicum*, Weinmann, Syll. Musc. Frond.; and his comparison of his specimens with Hedwig's figure of *Leskea fliculiformis*, Sp. Musc. t. 50, is most just and almost conclusive, for it gives a good idea of the size and appearance of the species even better than it does of the *Hypopterygium* for which it was intended.

CLIMACIUM, *W. et M.**C. DENDROIDES*, Linn.

Hab. Pend Oreille River, British Columbia, *Lyall*.

NECKERA, *Hedw.**N. MENZIESII*, Hook. et Wils.

Hab. Fort Colville, British Columbia, *Lyall*.

An authentic specimen in Sir W. Hooker's herbarium proves the *Mnium heteropterum* mentioned by Dr. Sibthorp in the 'Flora Græca' to be this moss,—at least so far as can be ascertained without fructification, in which in this tribe there is frequently a greater difference than in any other part of the plant.

N. DOUGLASII, Hook.

Hab. Vancouver Island, *Wood*; British Columbia, *Lyall*.

HOMALIA, *Brid.**H. OBTUSATA*, Mitten, Musci Ind.

Hab. British Columbia, *Lyall*.

A few imperfect specimens, apparently identical with the Indian species, which differs from *H. trichomanoides*, Schreb., in its more obovate leaves more rounded at their apices, the nerve sometimes imperceptible, and the cells in the apex shorter.

THAMNIUM, *Schimp.**T. NECKEROIDES*, (*Hypnum*) Hook. Musc. Exot. t. 58.

Hab. Vancouver Island, *Wood*.

One species only is enumerated by Sullivant in the United States, *T. Alleghaniense*, C. Müller; but there are the specimens of *T. neckeroides* collected by Drummond near St. Louis, no. 119; and *T. alopecurum*, (*Hypnum*) Linn., was sent from Boston by Green.

STEREODON, *Brid.*(*Plagiothecium*, Schimp.)*S. PULCHELLUS*, *Hedw.**Hab.* Fort Colville, *Lyll.*

These specimens correspond with authentic examples of *S. pulchellus* of the 'Bryologia Europæa.' But it appears very difficult to assign any constant character to *S. nitidulus*, viewed as a distinct species; for, besides these forms, there is a third, collected in Davis's Straits by Mr. Taylor, and also creeping amongst some of Drummond's specimens of *Webera longicolla*; it has its leaves about half as wide again as in *S. pulchellus*, but no other decided difference.

S. TURFACEUS, *Lindbg.**Hab.* Fort Colville, British Columbia, *Lyll.*

This very distinct species will doubtless in time be found in British North America.

S. GEMINUS, sp. nov. Monoicus, ramis assurgentibus intertextis, foliis ovatis ovato-acuminatisque patulis varie decurvis subsecundis subfalcatis marginibus minute serrulatis subintegerrimisve nervis latis usque ad medium productis, cellulis angustis elongatis basi paucis brevioribus, perichætalibus erectis internis longioribus latis breviter acuminatis, theca in pedunculo elongato ovali-cylindræa suberecta collo sensim attenuato, peristomio interno processibus angustis ciliis binis subæquilongis interpositis.

Hab. Rocky Mountains, alt. 6000–8000 feet, associated with *S. pulchellus* and *Mnium umbratile*, Mitten, *Lyll.*

Somewhat similar to *S. pulchellus*, *Hedw.*, but with leaves more gradually narrowed from a wider base, the thin but wide nerves continued to about the middle, the margin more or less evidently serrulate from the base to the apex, and the cells only half as long and narrower.

S. DONIANUS, *Sm.**Hab.* Fort Colville, *Lyll.**S. UNDULATUS*, *Hedw.**Hab.* Fort Colville, *Lyll.*(*Orthothecium*, Schimp.)*S. CHRYSÆUS*, (*Hypnum chryseon*) *Hornsch.**Hab.* Rocky Mountains, *Bourgeau and Drummond*, no. 221.

This species has been brought from Beechey Island, Wellington Channel, and Pond's Bay, in Arctic America, by Dr. *Lyll*, but, excepting Drummond's specimens, all are without fruit.

S. rufescens, Dicks., in a small state, was collected in Davis's Straits by Mr. Taylor; and from the same region he brought another species, which will certainly be found in Europe when carefully sought for. It may be characterized thus:—

S. RUBELLUS, sp. nov. Dioicus, cæspitosus, ramis erectis parce ramosis, foliis imbricatis ovatis concavis apiculo brevi flexuoso marginibus revolutis nervis binis brevissimis, cellulis elongatis alaribus inconspicuis, perichæcialibus imbricatis ovato-lanceolatis.

Hab. Davis's Straits, *Taylor*; Rocky Mountains, *Drummond*, intermixed with *Catoscopium nigratum*, Hedw. Sassar Pass, Nubra Mountains, Tibet, alt. 16,000–17,000 feet, *Thomson*.

A small moss, with all the habit, appearance, and colour of *Orthothecium intricatum*, Bryol. Europ., but differing in its almost exactly ovate leaves, with a short, sometimes discoloured apiculus, the margins revolute, and the areolation composed of cells which are twice as wide. In the same particulars it differs from *O. rufescens* and *O. chryseum*.

(*Pylaiesia*, Schimp.)

S. POLYANTHUS, *Schrad.*

Hab. Saskatchewan and Rocky Mountains, *Bourgeau*.

This moss appears to be abundant in British America.

(*Drepanium*, Schimp.)

S. REPTILIS, *Mich.*

Hab. Kootenay River, British Columbia, *Lyall*.

S. PLICATILIS, sp. nov. Dioicus, fastigiate ramosus, foliis falcatis secundis late ovatis acuminatis hamatis siccitate ruguloso-subplicatis, nervis brevibus, marginibus reflexis integerrimis, in ramulinis apice serrulatis, cellulis ad angulos pluribus abbreviatis parvis obscuriusculis, superioribus latitudine $\frac{1}{6000}$ longitudine $\frac{5-8}{6000}$ circiter unciae metientibus parietibus tenuibus, perichæcialibus erectis elongatis internis late oblongo-lanceolatis apice subulatis integerrimis plicatis, theca in pedunculo elongato cylindræa basi erecta medio curvata, operculo conico, peristomio interno processibus luteis perforatis ciliis binis æquilongis nodulosis interpositis.

Hab. Davis's Straits, *Taylor*; Rocky Mountains, *Bourgeau*. Also the "*Hypnum cupressiforme* β . *compressum*," Sweden, *Sommerfeldt*, in Herb. Hooker, appears to be the male plant, but is much less than any of the American specimens.

In size and general appearance the few specimens yet seen of this moss resemble *Hypnum callichroum*, Bridl., and are pale yellowish green, the older parts brown; it differs from all the states of *H. cupressiforme* in the strongly reflexed margins of its leaves and short cells.

S. CIRCINALIS, Hook. *Musc. Exot.* t. 107.

Hab. Vancouver Island, *Lyall*.

S. PLUMIFER, sp. nov. Dioicus, caespitosus, ramis procumbentibus, ramulis approximatis plumiformi-pinnatis, foliis falcatis secundis e basi latiore subovato-lanceolatis sensim tenuiter angustatis hamatis siccitate subplicatis, nervis tenuibus brevibus, marginibus inferne reflexis integerrimis, in ramulinis apice serrulatis, cellulis ad angulos paucis abbreviatis subobscuris, superioribus elongatis angustis, perichæcialibus elongatis erectis pallidis late lanceolato-subulatis apicibus serrulatis, theca in pedunculo elongato longe cylindracea suberecta curvata, operculo brevi subulato rostrato, peristomio dentibus pallidis teneris, interno tenero processibus latiusculis perforatis ciliis binis æquilongis angustis interpositis in membrana alte exserta.

Hab. N. America, *Drummond*; Canada, *Shepherd*; Columbia, *Douglas*; N.W. coast of America, *Douglas and Menzies*; Pack River, *Lyall*. Very common on trees and on the ground in British Columbia, *Lyall*; Vancouver Island, *Lyall*.

Shining yellowish green, becoming in age pale brown, more slender than *H. imponens*, and in habit approaching more to *H. crista castrensis*. In its narrow glossy leaves, long curved capsule, and rostrate operculum it is sufficiently distinct from *H. imponens* and *H. hamulosum*. This may be the *H. subimponens*, Lesq.; but the operculum is different from that described in the short account of the species.

S. CRISTA CASTRENSIS, Linn.

Hab. Saskatchewan, *Bourgeau*.

S. ROBUSTUS, Hook. *Musc. Exot.* t. 108.

Hab. Fort Colville and Pack River, *Lyall*.

Very few specimens, which give no further information as to the habit of the species.

Belonging to this group are also—

S. COMPLEXUS, sp. nov. Dioicus, late caespitosus, ramis pinnatis, foliis secundis e basi latiore ovato-lanceolatis hamatis concavis nervis binis brevibus marginibus subintegerrimis, cellulis ad angulos pluribus abbreviatis subquadratis obscurioribus, superioribus elongatis angustis apicibus quasi prominulis, perichæcialibus elongatis erectis oblongis subulatis, internis lanceolatis subito subulatis subserrulatis plicatis, theca in pedunculo rubro cylindracea inæquali inclinata, peristomio dentibus flavis e medio subulatis, interno processibus angustis ciliis binis interpositis.

Hab. On rocks between Fort William and Cumberland House, British N. America, *Richardson*.

In large interwoven patches of a dull-green colour. In general appearance very similar to that form of *H. cupressiforme* known as "*tectorum*," but its affinity is in other respects with *H. reptile*, Mich., in the form and especially the substance of its leaves, and in the plication of those of the perichætium; but the present species is certainly dioicous, more robust, and with scarcely serrulate leaves.

S. CIRCULARIS, sp. nov. Caule rufescente fastigiato ramoso, foliis secundis circinatis ovato-lanceolatis apice angustis acutis, breviter binervatis marginibus basi tantum subserrulatis, cellulis ad angulos paucis abbreviatis subobscuris flavidis, superioribus elongatis latitudine $\frac{1}{6000}$ longitudine $\frac{10-12}{6000}$ circiter unciae metientibus pellucidis.

Hab. Beechey Island and Wellington Channel, *Lyll.*

Pale yellowish green slightly tinged with brown. Stems one or two inches high; branches irregularly disposed, fastigiato; leaves all circinate, and so closely directed to the ventral side of the stem as to be laterally compressed. In general appearance and size nearest to *H. callichroum*, Brid., but the areolation of the base of the leaf is different.

(*Limnobium*, Schimp.)

S. OBTUSIFOLIUS, *Hook. et Wils.*

Hab. Poseidon River, *Lyll.*

A few specimens, all without fruit.

S. ARCTICUS, *Sommerf.*

Hab. Rocky Mountains, *Lyll.*

S. OCHRACEUS, *Turner.*

Hab. Cascade Mountains, British Columbia, *Lyll.* This moss is found also in Davis's Straits; and a few fragments of *S. turgescens*, Schimper, were also obtained there by Mr. Taylor.

(*Cuspidaria*, C. Müller.)

S. SCHREBERI, *Willd.*

Hab. Saskatchewan, *Bourgeau.*

This species does not well range here.

S. CUSPIDATUS, *Linn.*

Hab. Pack River, *Lyll.*

S. RICHARDSONI, sp. nov. Monoicus, caespitosus, ramis inordinatim pinnatis apice cuspidatis, foliis patentibus late ovatis apice rotundatis obtusis concavis integerrimis nervo medio evanido, ramulinis oblongo-lanceolatis obtusis, cellulis elongatis apicibus prominulis alaribus laxis ventricosis pallidis, perichætialibus ovalibus acutis laevibus imbricatis

seminerviis, theca in pedunculo elongato rubro cylindracea arcuata horizontali, peristomio normali.

Hab. N. America, *Richardson*. Supposed by Drummond to be from the Great Bear Lake. Coast of Greenland, Baffin's Bay, *Inglefield*.

The general appearance and yellowish-brown colour of this species is closely similar to that of *H. cuspidatum*, and it is intermediate between it and *H. cordifolium*.

S. GIGANTEUS, *Schimp.*

Hab. Fort Colville, *Lyall*.

This is the species distributed as *H. cordifolium* by Drummond, no. 209, but all the American examples are more slender than European specimens.

(*Campylium*, *Schimp.*)

S. CHRYSOPHYLLUS, *Brid.*

Hab. Saskatchewan, *Bourgeau*.

S. HISPIDULUS, *Brid.*

Hab. Mooyie River, *Lyall*.

(*Amblystegium*, *Schimp.*)

S. COMPACTUS, *Bruch et Schimp.*

Hab. Near Fort Colville, *Lyall*.

S. RADICALIS, *Beauv.!*

Hab. Saskatchewan, by the river near Fort Ellice, *Bourgeau*; *Pack* River, Galton Mountains, and Cascade Mountains, *Lyall*.

This much misunderstood species differs from *S. serpens*, *Linn.*, in its narrower and longer leaf-cells; it occurs in Europe, but is confused with the following species.

S. VARIUS, (*Leskea*) *Hedw.*

Hab. Saskatchewan, *Bourgeau*; *Pend Oreille* River, *Lyall*.

S. RIPARIUS, *Linn.*

Hab. Saskatchewan and Rocky Mountains, *Bourgeau*.

S. KNEIFII, *B. et S.*

Hab. Rocky Mountains, *Lyall*; Saskatchewan, *Bourgeau*.

S. UNCINATUS, *Hedw.*

Hab. Cascade, Galton, and Rocky Mountains, *Lyall*.

S. VERNICOSUS, *Lindbg.*

Hab. *Pack* River, *Lyall*.

S. FILICINUS, *Linn.*

Hab. Saskatchewan, *Bourgeau*; Mooyie River, *Lyall*. The variety *Vallis-Clausæ* in running water, Fort Colville, *Lyall*.

S. COMMUTATUS, *Hedw.*

Hab. Rocky Mountains, *Bourgeau*.

FONTINALACEÆ, *Schimp.*DICHELHYMA, *Myrin.*

D. UNCINATUM, sp. nov. Foliis tristichis falcatis secundis lanceolatis sensim longe tenuiter angustatis complicatis nervo excurrente apice denticulato marginibus e medio ad apicem minute serrulatis, cellulis elongatis angustis, perichætialibus convolutis externis oblongis obtusis internis elongatis acutioribus, theca in pedunculo brevi exserta ovali interdum inæquali, operculo subulato subæquilongo, peristomio interno toto cancellato externo paulo longiore, habitu *D. falcati*.

Hab. Fort Colville, British Columbia, *Lyall*.

Rather more slender than *D. falcatum*, *Myrin*, and its stems more subpinnate; its leaves more setaceous from the excurrent nerve, which is smooth beyond the serrulate margins and denticulate only at its apex. The perichætial leaves are not twisted; and the internal peristome, which resembles a perfect cancellate cone, only exceeds the external teeth by about one-fifth of their length.

Male plants of *D. falcatum* have sometimes leaves with narrow points, but it is difficult to see if the nerve is continued into them, or if they are merely a prolongation beyond it, as is common in many mosses. The calyptra is not adherent by its base in any of the specimens of *D. uncinatum*.

FONTINALIS, *Dill.*

F. ANTIPYRETICA, *Linn.*

Hab. On stones in the river, Fort Colville, British Columbia, *Lyall*.

Appears to be identical with the European species.

F. SQUAMOSA, *Linn.*

Hab. Saskatchewan, *Bourgeau*.

LESKEA, *Hedw.*

(*Leskea*.)

L. POLYCARPA, *Ehrh.*

Hab. British Columbia, Pend Oreille River, *Lyall*.

(*Thuidium*, *Schimp.*)

L. GRACILIS, *B. et S.*

Hab. Saskatchewan, *Bourgeau*.

This is probably *Hypnum* (*Stereodon*) *Virginianum*, *Brid.*

L. ABIETINA (*Linn.*).

Hab. Lake Winnipeg, *Bourgeau*.

L. BLANDOVII (*Web. et Mohr*).

Hab. Fort Colville, *Lyall*.

L. DELICATULA (Linn.).

Hab. Saskatchewan, *Bourgeau*.

L. CRISPIFOLIA, Hook. *Musci Exot.* t. 31.

Hab. British Columbia and Pend Oreille River, *Lyll*; Vancouver Island, *Wood*.

TRACHYPUS, *Schw.**T. NIGRESCENS*, (Neckera) *Sw.*

Hab. Lake Huron, in fruit, *Todd*; also sent from Canada West, *Emery*, in Herb. Miles.

The occurrence of this species (which seems to be precisely the same as Swartz's, from a specimen in Herb. Hooker.) in a country so much further north, was at first regarded with some suspicion, but this is now entirely removed by the specimens recently collected by Mr. Emery.

LEUCODONTACEÆ, *Mitten*, *Musci Ind.**HEDWIGIA*, *Ehrh.**H. CILIATA*, *Ehrh.*

Hab. Mooyie River (a branch of the Kootenay), British Columbia, *Lyll*.

HEDWIGIA PILIFERA, sp. nov. Monoica, ramis ascendentibus laxe cæspitosis dichotome divisis ramulis superioribus abbreviatis, foliis subsecundis ovatis ovato-acuminatisque acumine diaphano, foliis ramulinis (flagelliformibus) pilo longo flexuoso terminatis marginibus integerrimis revolutis, cellulis parvis breviter oblongis inferioribus paululo longioribus basi fuscis dorso papillois, perichæcialibus erectis longioribus ovato-lanceolatis, theca in pedunculo gracillimo trilineari subglobosa ætate evacua sub ore amplo contracta circiter decemPLICATA, calyptra elongata cucullata fusca lævi.

Hab. Vancouver Island, on rocks, *Lyll*.

A little more slender than *H. ciliata*, *Ehrh.*, but agreeing very nearly with it in general appearance. The younger portions of the stems are of a yellowish green, the older brown. The fruitstalk is very slender and pale red. The capsules, which are all old and empty, are contracted below the mouth, and the fruitstalk is affixed to their base without an attenuated neck.

This species has been here referred to *Hedwigia*, although it belongs to that small group of species which has been named by M. Schimper *Hedwigidium*, differing from *Hedwigia*, as originally founded by Ehrhart on *H. ciliata*, in the more cucullate calyptra and the presence of flagelliform shoots; these last are represented in *H. pilifera* by short ramuli, with leaves having very long hair points, but in all the specimens these ramuli are not decurved,

nor would they be distinguishable from the others except by their leaves. The capsule of *H. pilifera* and *H. imberbis* is plicate when old, but this character is observable in *H. Humboldtii*, Hook., which is considered by M. Schimper to present distinctions sufficient to constitute another genus, *Harrisonia*, and, according to him, to be placed amongst the pleurocarpous mosses; but there is no real difference in the position of the fertile flower in any of the species; and the distinctions upon which these genera have been propounded, when considered in connexion with those existing between the species of eminently natural genera, such as *Orthotrichum* and *Fissidens*, seem to be merely specific. The original position of the fertile flower appears to be terminal on the branches, which, producing innovations from immediately below it, render it apparently lateral in the more branched species.

Among the species included in the genera *Hedwigia*, *Hedwigidium*, *Braunia*, and *Harrisonia*, there is the closest affinity in the structure of the leaves and in the mode of growth, excepting that *H. ciliata* is destitute of flagelliform branches. In the form of the capsule there is considerable diversity; in *Hedwigidium* and *Harrisonia* it is short and plicate, in *Braunia* it is elongate and smooth. In all these genera the calyptra is elongate and cucullate, in *Hedwigia* it is short and mitriform; but the value of the genera distinguished by these characters is destroyed when compared with other groups of species forming the most natural genera, *Orthotrichum* and *Grimmia*. In the first there is as great a diversity in the form and plication of the capsule, and in the second as much difference in the calyptra of species in most other respects so very closely resembling each other, that more confusion would arise in dividing them on the strength of that character alone than in leaving them together. The distinctions therefore between the *Hedwigia*, measured in comparison, are rather of a sectional and specific nature than generic, and the mere multiplication of genera serves no useful purpose.

The position of the species composing the group here understood as *Hedwigia* has been variously estimated by authors. Müller places them amongst his Hypnoid mosses, *H. ciliata* in his *Pilotrichum*, and the residue in the section *Pterygynandrum* of his interpretation of the genus *Neckera*. Schimper places them, excepting *H. Humboldtii*, between his families *Grimmiæ* and *Ptychomitriæ*; but the affinity between some forms of *Grimmia* and *Hedwigia ciliata* is less than that existing between the flagelli-

ferous *Hedwigia* and *Leucodon sciuroides*, which produces flagella of exactly the same kind as those of *H. (Braunia) sciuroides*. In *Cryphea* there are several species which closely resemble *H. ciliata* and *H. imberbis*, having their fruit terminal on their branches, and immersed in a similar manner. There is also a great resemblance between the more branched *Hedwigia* and *Antitrichia curtispindula*, Brid., which also produces the same kind of flagella, and is in reality itself only a *Leucodon* with a more completely developed peristome, and improperly separated from that genus.

Since the foregoing description of this moss was written, there has appeared, in the Transactions of the American Philosophical Society, Mr. Lesquereux's description of *Braunia Californica*, which, in so far as can be generally gathered from the description, would appear to indicate the same species. On consideration, however, as there are some discrepancies, it has been thought best to let the description of *H. pilifera* stand, and to point out the differences which exist between Dr. Lyall's specimens and Mr. Lesquereux's description. They are, in our specimens, the stems not "vel simplicibus vel irregulariter innovando ramosis," nor "apice incrassatis duris;" the perichætal leaves not "brevioribus," but elongated, and the capsule plicate—in fact it is just the capsule of *H. imberbis* on an elongated pedicel. Mr. Lesquereux says that his species has a capsule "exactly top-shaped" when deoperculate, but nothing about the plication so evident in our specimens.

ANTITRICHIA, Brid.

A. CURTISPINDULA, Linn.

Hab. Vancouver Island, Wood; British Columbia, Lyall and Douglas.

Very different in external appearance from the usual European states; but there seems to be no sufficient distinction between these specimens and the form which has a more slender habit and elongate capsules, enumerated by Schimper as var. β . *Hispanica*. Some of the specimens are very slender.

SPIRIDENS, Nees.

S. ABIETINUS, Hook. *Musc. Exot.* t. 7.

Hab. British Columbia, Lyall, Douglas, and Menzies.

POLYTRICHACEÆ.

BUXBAUMIA, Haller.

B. APHYLLA, Haller.

Hab. Cascade Mountains, British Columbia, Lyall.

ATRICHUM, *Beauv.**A. UNDULATUM* (Linn.).*Hab.* Fort Colville, *Lyall*.

A. PARALLELUM, sp. nov. Dioicum?, caulibus breviusculis, in fertilibus foliis superioribus ligulato-lanceolatis, basi pro spatio oblongo inferne cellulis oblongis superne rotundatis areolato subintegerrimo lævibus, inde marginibus argute dentatis, dorso laminis dentiformibus nervo lamellato percurrente parallelis, nervo etiam dorso lamellis circiter tribus serratis carinato, foliis inferioribus oblongis obtusioribus, perichætialibus e basi oblonga convoluta sensim angustatis lanceolatis, theca in pedunculo elongato cylindræa curvata basin versus ventricosa.

Hab. Grande Côte, Rocky Mountains, *Drummond*, intermixed with *Oligotrichum aligerum*.

Size and habit of *A. undulatum*, Linn., but capsules more ventricose below. Intermixed with the fertile stems are others of about the same height, having the leaves all short and with a terminal bud, which appears to be young male inflorescence, but too young to be safely considered such. The parallel disposition of the tooth-like processes on the back of the leaf and the cristate nerve suffice to distinguish this species from *A. undulatum*, for which it was overlooked by *Drummond*.

OLIGOTRICHUM, *DeCand.*

O. ALIGERUM, sp. nov. Caule breviusculo, foliis patulis e basi brevi paululo latiore oblonga lævi integerrima cellulis quadrato-rotundatis distinctis viridibus areolata lanceolatis obtusiusculis brevi-dentatis dorso lamellis dentatis longitudinalibus alatis, nervo percurrente lamellato dorso etiam lamellis circiter quinis dentatis carinato, perichætialibus caulinisque perichætium versus e basi obovata vaginante erecta cellulis elongatis pellucidis areolata subulatis angustioribus cæterum caulinis similibus, theca in pedunculo elongato cylindræa inferne ventricosa curvata, calyptra apice pilis paucis hirta.

Hab. Grande Côte, Rocky Mountains, *Drummond*.

In size and general appearance like *O. hercynicum*, for which species it was overlooked by *Drummond* himself; but its leaves are narrower, and when dry more crisped, and the presence of the lamellæ on the underside of the leaf itself, as well as upon both sides of the nerve, is remarkable and peculiar.

POGONATUM, *Brid.**P. ALPINUM* (Dill.).

Hab. Between Fort Colville and Cascade Mountains, British Columbia, *Lyall*.

Some of the specimens from N.W. America are very large, with the leaves spreading and recurved, and the capsule erect and elongate, but there appears to be no real difference excepting the external appearance.

Besides the *P. contortum*, Menzies, collected by himself in N.W. America, there are in Herb. Hooker. some specimens, not in a very good state, of what appears to be another species, more nearly allied to *P. aloides*.

P. ATROVIRENS, sp. nov. Caule simplici elongato, foliis patentibus siccitate incurvis subcrispatis e basi latiore cauli appressa late lanceolatis acutis marginibus. fere a basi ad apicem serratis nervo dorso dentato pagina superiore partis folii lanceolatis lamellis fere tota oblecta, theca in pedunculo unciali oblonga erecta, operculo convexo brevirostro.

Hab. Sitka, Barclay.

About three inches high, blackish brown. Foliage softer than in *P. aloides*, the base with larger cells, the margins serrate almost to the very base.

P. contortum differs from this in its leaves being more nearly lanceolate throughout, not sheathing below, and the areolation at the base nearly the same as on the upper part, where they are more gradually narrowed into the point.

POLYTRICHADELPHUS, *C. Müller.*

P. LYALLII, sp. nov. Caule brevi breviter fastigiatim ramoso inferne subnudo superne, foliis e basi oblonga latiore erectiore amplexante lanceolatis patentibus sensim acutis lamellis obtectis marginibus e medio ad apicem serratis incurvis dorso convexis lævibus aut in superioribus paucidentatis, perichætialibus internis basi longioribus convolutis apicibus brevioribus, theca in pedunculo elongato flexuoso rubro suboblonga inferne ventricosa inclinata ætate horizontali supra biplicata spatio intermedio concava infra irregulari convexa basi apophyse plicata rugosa brevi sub ore contracto, operculo subulicurvirostrato, calyptra pilis paucis brevibus appressis.

Hab. In swampy places on the east side of the Cascade Mountains, British Columbia, at an elevation of 7000 feet, July 1860, *Lyall*.

All the specimens agree in their short stems, rarely simple, with a single perichætium, but branched in a close fastigate manner, so that at first sight the stems have the appearance of bearing a number of setæ from nearly the same point; on examination, however, each seta is found to be terminal on its own proper branch, and of these as many as nine have been observed

on the same stem; the habit is thus the same as in *P. dendroides*, with the stems and branches abbreviated and the setæ lengthened.

• POLYTRICHUM, *Dill.*

P. PILIFERUM, *Schreb.*

Hab. Vancouver Island, *Lyall.*

P. JUNIPERINUM, *Hedw.*

Hab. Saskatchewan, *Bourgeau.* Vancouver Island and near Fort Colville, British Columbia, *Lyall.* The variety *alpestre* on Cascade Mountains, British Columbia, *Lyall.*

SPHAGNUM, *Dill.*

S. ACUTIFOLIUM, *Ehrh.*

Hab. Saskatchewan and Lake Winnipeg, *Bourgeau.*

HEPATICÆ.

A small number of species belonging to this order, without any new form, are present in the collections from the Survey; and the species which in Europe are found on the ground are almost entirely unrepresented in the collections yet seen from British North America.

JUNGERMANNIA, *Linn. (Syn. Hepat.).*

J. BARBATA, *Schreb.*

Hab. The var. *lycopodiodes*, Nees, Galton Mountains, and on stones in the Columbia River, *Lyall.* The var. *quinquedentata*, Nees, Galton Mountains, *Lyall.* The var. *Floerkii*, Nees, Kettle Falls, Columbia River, *Lyall.*

J. VENTRICOSA, *Dicks.*

Hab. Vancouver Island and Fort Colville, *Lyall.*

J. INCISA, *Schrad.* *J. supina*, *Taylor.*

Hab. Fort Colville, *Lyall.*

J. MICHAUXII, *Weber.* *J. oblongata et J. anacampta*, *Taylor.*

Hab. Near Fort Colville and Columbia River, *Lyall.*

J. EXSECTA, *Schmid.* *J. scitula*, *Taylor.*

Hab. Fort Colville, *Lyall.*

J. CORDIFOLIA, *Hook.*

Hab. Fort Colville and Galton Mountains, *Lyall.*

J. RIPARIA, *Taylor.*

Hab. On stones in the Colville River, Fort Colville, *Lyall.*

J. SCHRADERI, *Mart.*

Hab. About Fort Colville and the Colville River, *Lyall.*

LIOCHLÆNA, *Nees*.L. LANCEOLATA, *Nees*.*Hab.* Mooyie River, British Columbia, *Lyall*.SOLENOSTOMA, *gen. nov.*

Perianthium terminale, obovatum, superne quinqueplicatum, ore in tubulum brevem contracto rostelliformi. *Folia* disticha, integra. *Amphigastria* parva obsoletave.

S. TERSUM, (*Jungermannia*) *Nees*.*Hab.* Galton Mountains, *Lyall*.

Two species only of this group are yet certainly known from the whole of N. America. The other species, *S. crenulatum* (*Jungermannia*, Sm.), is indicated by Sullivant in Alabama.

This genus, long confounded with *Jungermannia*, differs from it in the form and plication of the perianth, which is similar to that of *Lejeunia* and *Frullania*, and only becomes dentate at the apex by the bursting through of the capsule.

LEIOSCYPHUS, *Mitten*.L. TAYLORI, *Hook*.*Hab.* Cascade Mountains, *Lyall*.PLAGIOCHILA, *Nees et Mont*.P. ASPLENIOIDES (*Linn.*).*Hab.* Fort Colville, *Lyall*.LOPHOCOLEA, *Nees*.L. HETEROPHYLLA, *Hook*.*Hab.* Fort Colville, *Lyall*.

The few fragments supposed to belong to this species are merely sufficient to indicate the presence of something very nearly allied, if not identical.

TRIGONANTHUS, *Spruce*, in *Trans. Bot. Soc. Edin.* vol. iii. et in *Ann. & Mag. Nat. Hist.* s. 2. vol. v. p. 207.

(*Jungermannia bicuspidata*, *Synops. Hepat.*)

T. BICUSPIDATUS, *Linn.**Hab.* Rocky Mountains, *Lyall*.

T. DIVARICATUS, *Smith*, *Eng. Bot.* t. 719. *Jungermannia Starkii*, *Fk. Synops. Hepat.* p. 134.

Hab. Cascade Mountains, British Columbia, *Lyall*.

These specimens have stipules, as is usual in the form referred to *J. Starkii*,

T. DENTATUS, Raddi.

Hab. Galton Mountains, British Columbia, *Lyall*.

CHILOSCYPHUS, Corda.

C. POLYANTHUS (Linn.).

Hab. Near Fort Colville, *Lyall*.

HARPANTHUS, Nees.

H. FLOTOVIANUS, Nees. *Pleuranthe olivacea*, Taylor, in *Lond. Journ. Bot.* 1846, p. 282; *Synops. Hepat.* p. 689.

Hab. Rocky Mountains, Bourgeau.

Chiloscyphus Drummondii, Taylor (*Lond. Journ. Bot.* 1846, p. 283; *Synops. Hepat.* p. 709), appears to be in no way different from *H. scutatus*, (*Jungermannia*) Weber et Mohr; and the habitat of this and some other North American species was incorrectly given by Taylor "in arborum cortice," for the plants are found growing on rotten wood.

SCAPANIA, Lindenbergl.

S. ALBICANS (Linn.).

Hab. Rocky Mountains, Bourgeau. Fort Colville, *Lyall*.

S. NEMOROSA (Linn.).

Hab. British Columbia, *Lyall*.

S. UNDULATA (Linn.).

Hab. Rocky Mountains, *Lyall*.

LEPIDOZIA, Nees.

L. REPTANS, Linn.

Hab. Fort Colville, *Lyall*.

MASTIGOBRYUM, Nees.

M. AMBIGUUM, Lindenbergl.

Hab. British Columbia, *Lyall*.

RADULA, Nees.

R. COMPLANATA, Linn.

Hab. British Columbia, *Lyall*.

A few fragments only.

MADOTHECA, Dumort.

M. NAVICULARIS, Nees. *M. Douglasii*, Tayl. *Lond. Journ. Bot.* 1846, p. 379.

Hab. Vancouver Island and near Fort Colville, British Columbia, *Lyall*.

M. LÆVIGATA, *Schrad.*

Hab. Kettle Falls, Columbia River, *Lyall.*

M. PLATYPHYLLOIDEA, *Nees.*

Hab. Fort Colville, *Lyall.*

PTILIDIUM, *Nees.*

P. CILIARE, *Ehrh.*

Hab. Fort Colville, *Lyall.*

CHETOPSIS, *gen. nov.*

Perianthium terminale, obovatum, tubulosum, ore connivente ciliato. *Folia* et *amphigastria* palmatifida.

C. TRICHOPHYLLA, *Linn.*

Hab. Cascade Mountains, *Lyall.*

FRULLANIA, *Raddi.*

F. TAMARISCI, *Linn.*

Hab. Vancouver and Orcas Islands, *Lyall.* Collected also on the N.W. coast by *Menzies* and *Douglas.*

The specimens are very slender, and at first sight would scarcely be supposed to belong to the same species as the European forms. The leaves are rounded, in the fertile stems acute, in the male plants with the point inflexed, and the coloured cells in some of the leaves are only found after careful search. No American examples have yet been seen which can compare with British ones in size.

METZGERIA, *Raddi.*

M. PUBESCENS, *Schrank.*

Hab. British Columbia, *Lyall.*

SARCOMITRIUM, *Corda.*

S. PALMATUM, *Hedw.*

Hab. Fort Colville, *Lyall.*

MARCHANTIA, *Linn.*

M. POLYMORPHA, *Linn.*

Hab. Saskatchewan and Rocky Mountains, *Bourgeau.* Fort Colville and Sinyakwateen, *Lyall.*

FEGATELLA, *Raddi.*

F. CONICA, *Linn.*

Hab. British Columbia, near Fort Colville, *Lyall.*

EXPLANATION OF THE PLATES.

PLATE V.

Barbula rubiginosa.

- 1, plant, natural size.
- 2, leaf; 3, transverse section of same; 4, perichætal leaf; 5, capsule: all magnified.

Encalypta longipes.

- 1, plant, natural size.
- 2, leaf; 3, perichætium; 4, capsule: all magnified.

Hypnum æneum.

- 1, plant, natural size.
- 2, cauline leaf; 3, branch leaf; 4, perichætial leaf; 5, capsule; 6, portion of peristome: all magnified.

Hypnum ædipodium.

- 1, plant, natural size.
- 2, cauline leaf; 3, branch leaf; 4, perichætium and male flower; 5, capsule; 6, portion of peristome: all magnified.

PLATE VI.

Hypnum declivum.

- 1, plant, natural size.
- 2, cauline leaf; 3, branch leaf; 4, perichætium and male flower; 5, capsule; 6, portion of peristome: all magnified.

Hypnum acutum.

- 1, plant, natural size.
- 2, cauline leaf; 3, perichætial leaf and male flower; 4, capsule; 5, portion of peristome: all magnified.

Hypnum asperrimum.

- 1, plant, natural size.
- 2, cauline leaves; 3, branch leaf; 4, perichætium; 5, capsule; 6, portion of peristome: all magnified.

Hypnum aggregatum.

- 1, plant, natural size.
- 2, stem leaves; 3, perichætium; 4, capsule; 5, portion of peristome: all magnified.

PLATE VII.

Pterogonium procurrens.

- 1, plant, natural size.
- 2, cauline leaf; 3, branch leaf; 4, perichætium; 5, capsule: all magnified.

Stereodon plumifer.

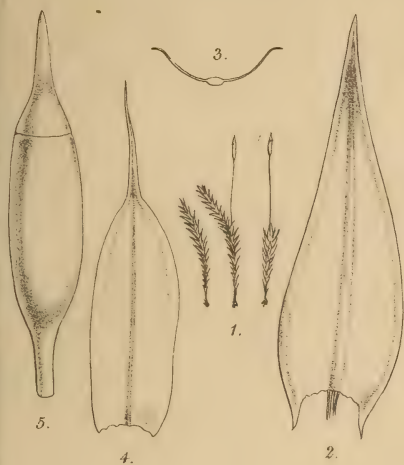
- 1, plant, natural size.
- 2, stem leaves, with transverse section; 3, branch leaf; 4, perichætium; 5, capsule; 6, portion of peristome: all magnified.

Stereodon geminus.

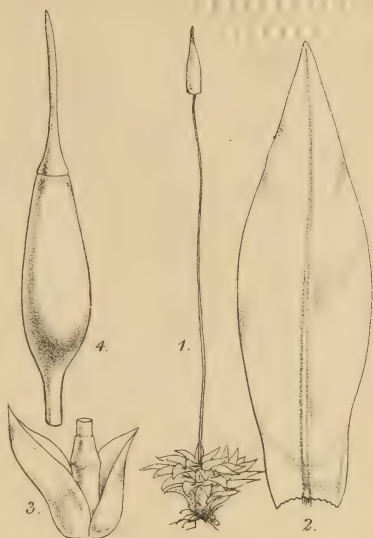
- 1, plant, natural size.
- 2, stem leaf; 3, branch leaf; 4, perichætium and male flower; 5, capsule; 6, portion of peristome: all magnified.

Hedwigia pilifera.

- 1, plant, natural size.
- 2, stem leaf; 3, leaves from the branches; 4, transverse section; 5, perichætium; 6, male flower; 7, capsule: all magnified.



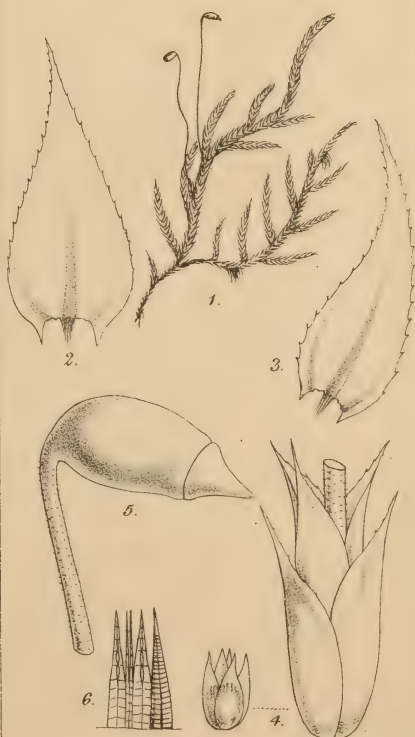
Barbula rubiginosa.



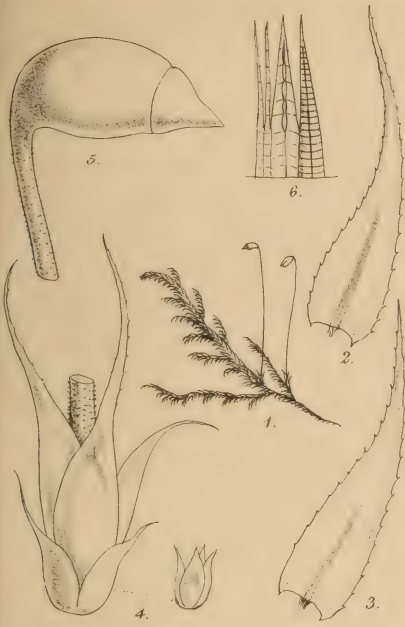
Encalypta longipes



Hypnum æneum.



Hypnum cætipodium.



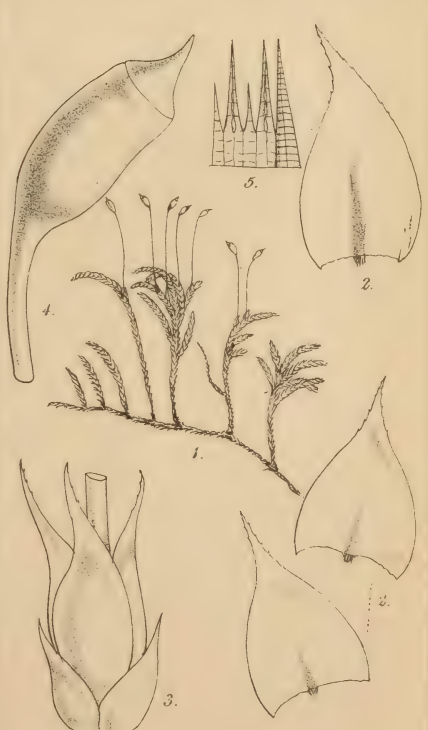
Hypnum declivum.



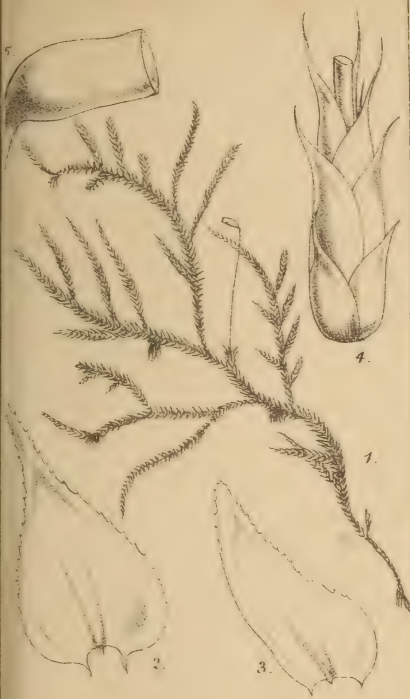
H. acutum.



H. asperrium.



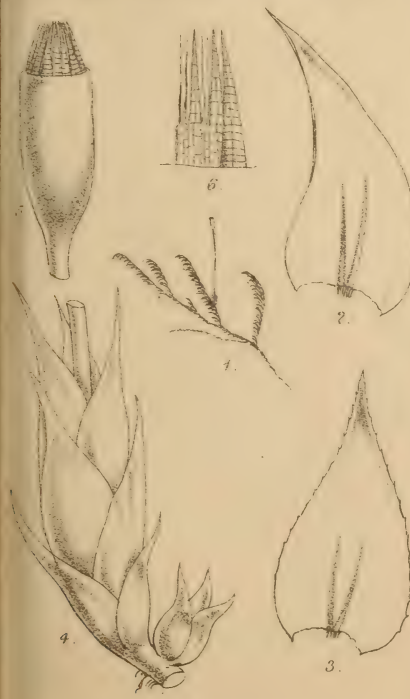
H. aggregatum.



Pterogonium procurrens



Stereodon plumifer



Stereodon geminus



Hedwigia pilifera





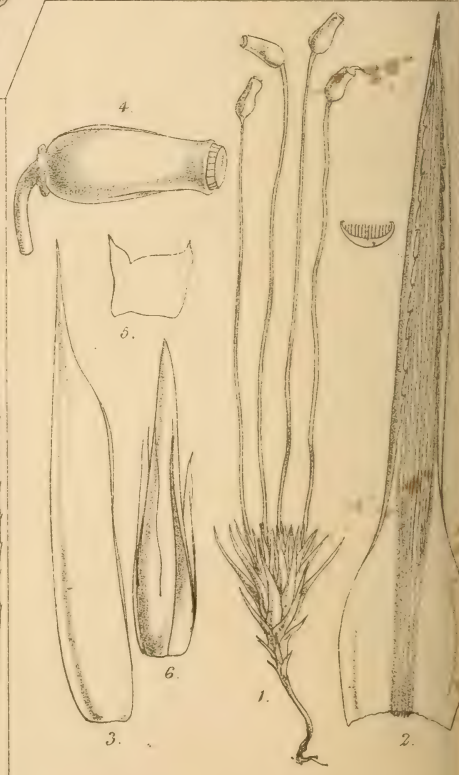
Dichelyma uncinatum



Atrichum parallelum



Oligotrichum aligerum



Polytrichadelphus Lyallii

PLATE VIII.

Dichelyma uncinatum.

- 1, plant, natural size.
- 2, leaf; 3, perichaetium and capsule 4, portion of peristome: all magnified.

Atrichum parallelum.

- 1, plant, natural size.
- 2, leaf from the lower part; 3, the same from upper part of the stem;
4, transverse section of the middle of the latter; 5, perichaetial leaf: all magnified.

Oligotrichum aligerum.

- 1, plant, natural size.
- 2, a leaf from the middle of the stem; 3, perichaetial leaf; 4, perigonal leaf; 5, calyptra: all magnified.

Polytrichadelphus Lyallii.

- 1, plant, natural size.
 - 2, leaf from the middle of the stem, with section; 3, perichaetial leaf; 4, capsule; 5, section of same; 6, calyptra: all magnified.
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CONTRIBUTIONS

TO THE

CRYPTOGAMIC FLORA OF THE ATLANTIC
ISLANDS.

BY

WILLIAM MITTEN, A.L.S.

[PLATES I. & II.]

THE Moss-Flora of the Azores, the Canaries, and Madeira, so far as it is possible to judge from the small collection from the Azores given by Mr. H. C. Watson, the enumeration of those from the Canaries by Dr. Montagne in Webb and Berthelot's 'Hist. des Iles Canaries,' and the collections brought home year by year by Mr. J. Y. Johnson on his return from his winter residence in Madeira, would appear to be very nearly identical. Nearly all the species enumerated from the Canaries have already been detected in Madeira; but, even when allowance is made for the position of the Flora as belonging to the Mediterranean region, there still remain a number of species attributed to that Flora which ought to occur in Madeira. Besides the presence of a few species so far as yet known peculiar to the Atlantic Islands, as *Astrodontium Canariense* and *Neckera intermedia*, Brid., their Flora contains some other species which, although hitherto known to occur in very few places in Europe, may be expected to be found on the south or western coasts of the British Islands. That this supposition is not unreasonable is proved by the finding of *Myurium Hebridarum*, Schimp., a moss common to the Azores and Madeira, in the Hebrides. Amongst the specimens obtained by Mr. Johnson in Madeira are three remarkable species, supposed, in the accompanying descriptions, to belong to the Leskeoid mosses; of these

only one has as yet been met with in fruit; but the presence of these three closely allied species in such a circumscribed area is interesting, for it is only in Australia, Tasmania, and New Zealand that two certainly congeneric species are known to exist. To these are added descriptions of a few other curious species, chiefly from Madeira.

MUSCI.

ANÆCTANGIUM, Schw.

A. ANGUSTIFOLIUM, sp. nov. Caule brevi gracili, foliis patentibus linearibus basi paululo angustioribus concavis apice acutis nervo percurrente, cellulis basi paucis quadratis pellucidis sensim in minutas rotundatas subleves transeuntibus, perichætialibus ovato-lanceolatis, theca in pedunculo gracili obovata.

Hab. Teneriffe, "ad rupes sylvarum," Schmidt in *Herb. Hooker.* no. 46.

Less than *A. compactum*, Schl., and softer. The leaves are about ten times as long as broad, pale green, subcrispate when dry; the cells very minute, but distinct.

A. compactum occurs in Teneriffe and Madeira, and grows associated with *Zygodon curvipes*, C. Müller, a moss which is found also on the mountains of Abyssinia and does not appear to differ from *Z. cyathicarpus*, Mont., so widely distributed in the southern hemisphere.

GLYPHOMITRIUM, Brid.

(*Ptychomitrium*, Schimp.)

G. PULVINARE, sp. nov. Monoicum, pulvinatum, foliis patentibus incurvis e basi subovata lanceolatis acutis nervo excurrente marginibus integerrimis, cellulis basi paucis quadratis rectangulatis cito in parvas rotundatas approximatas transeuntibus diametro circiter $\frac{1}{2000}$ unciae metientibus, perichætialibus conformibus, theca in pedunculo trilineari obovata, operculo rostro theca dimidio brevior, peristomio dentibus brevibus solidis.

Hab. Madeira, on rocks, Johnson.

Growing in small hemispherical tufts of a dull dark green colour, much resembling *G. crispatum*, Bridel = *Grimmia crispata*, Hook., but with leaves having the cells of the upper portion much larger and those of the base not elongated. *G. polyphyllum*, Dicks., is abundant and very fine in Madeira.

According to M. Schimper, *Ptychomitrium*, to which he refers *G. polyphyllum* and some other species, differs from *Glyphomitrium* in having the teeth of its peristome not approximated in pairs and

not hygroscopic; and *Brachysteleum* of Hornschuch (an older name applied to the same species) he is willing to retain for the reception of such species as have a short seta; but these are all the distinctions upon the strength of which they are to be considered coequal genera with *Glyphomitrium*.

Brachyodus, Nees et Hornschuch, and *Campylosteleum*, Bruch et Schimper, owe their distinction from *Glyphomitrium* chiefly to their diminutive size; besides which, the only characters in *Brachyodus* are the short peristome and the plication of the empty capsule, and in *Campylosteleum* the curved fruitstalk; for in the latter the peristome is similar to that of *Ptychomitrium*. All the species of these supposed genera agree in the areolation of their leaves, the mitriform calyptra, and in having a peristome which among them passes through similar forms to those observable in *Grimmia*, to which they appear to form an allied and closely related genus—differing in habit and areolation, but agreeing in the structure of the peristome, the highest development of which appears in *Glyphomitrium polyphyllum* and *Grimmia (Racomitrium) canescens*, Dill.

ULOTA, *Brid.*

U. VITTATA, sp. nov. Habitu staturaque *U. Bruchii*, foliis patentibus siccitate crispatis e basi latiore subovata sensim lineari-lanceolatis apice obtusiusculis nervo carinatis integerrimis, cellulis basi ad latera seriebus singulis hyalinis quadratis interioribus ad nervum elongatis angustis, ad margines usque ad folii medium seriebus circiter sex cellularum elongatarum angustarum vittam plus minus distinctam formantibus, theca ovali sensim in pedunculum attenuata siccitate plicata rubrofusca, peristomio *U. Bruchii*, calyptra ramentis paucis brevibus appressis.

Hab. Madeira, on trees on the mountains, *Johnson*.

Different from *U. crispa*, Hedw., and *U. Bruchii*, Hsch., in its calyptra and in the presence of the bands of elongated cells, which are not truly marginal, for a single row of rounded cells forms the margin; this vittation is not uniformly evident in every leaf, but is generally so. The rounded cells of the upper part of the leaf are about half the size of those of *U. crispa*.

BRYUM, *Dill.*

B. NOTARISII, sp. nov. Dioicum, dense cæspitosum, nitidum, foliis confertis patentibus ovato-lanceolatis apice latiusculo apiculo parvo sensim acuminatisve nervo crassiusculo in mucronem excurrente, margine superne parce denticulato medio recurvo, cellulis basi quadratis oblongis deinde longioribus prosenchymaticis, perichætialibus basi

lationibus, theca in pedunculo gracili rubro horizontali pendulave clavata rubra, operculo conico, peristomio dentibus angustis elongatis pallidis, interno carente.—*B. alpinum*, var. *Mediterraneum*, De Notaris, Syll. p. 129. *B. princeps* et *nuperius*, *B. gemmiparum*, ejusd. MS. *B. semicompletum*, Mitten in lit.

Hab. Madeira, on the earth in moist places, *Johnson*. In insulis freti Bonifacii maris Mediterranei, *De Notaris*.

Intermediate in size between *B. alpinum*, Linn., and *B. Sauteri*, B. et S., but most nearly allied to the former, from which it is distinguished by its smaller size, short densely tufted stems, and the form and substance of the leaves. In all the specimens yet examined there has been no trace of internal peristome.

B. OBOVATUM, sp. nov. Dioicum, foliis patentibus obovatis rigidis nervo crasso breviter excurrente mucronatis, margine crasso tereti superne parce indistincte denticulato, cellulis fere omnibus conformibus utriculo repletis basi nec oblongis nec rectangularibus, theca in pedunculo elongato clavato-cylindracea pendula, operculo conico, peristomio normali.

Hab. Madeira, near Funchal, on the earth, 1858, *Johnson*.

Like *B. Donianum*, Grev., in size and habit, but with leaves twice as wide, having a firm terete margin, and cells much smaller; in the same particulars it differs from *B. capillare*, Hedw., which is also found in Madeira.

LEPIDOPILUM, *Brid.*

(*Tetrastichium*.)

L. FONTANUM, sp. nov. Caule prostrato viridi vage ramoso simplicive, foliis quadrifariis compressis planis, seriebus dorsalibus divergentibus majoribus elongato-oblongis apice acuminatis basi asymmetricis margine apice serrulatis inferne integerrimis enerviis, seriebus ventralibus patenti-divergentibus angustioribus ovali-lanceolatis subintegerrimis, cellulis laxissimis prosenchymaticis pellucidis.

Hab. Madeira, João Gomez Ravine, about springs, *Johnson*.

The specimens of this fine moss are too fragmentary to give a good idea of its habit; it appears to be prostrate, but not rooting. Some of the specimens are more than 2 inches long, and produce irregular branches resembling the main stem; others have numerous short branches with uniform small oval obtuse leaves, still retaining, however, the quadrifarious arrangement; but in both cases the branches are confined to one side of the stem. The leaves are pale glaucous green, and so inserted as to leave the stem continuously visible along the dorsal side; the arrangement in

four series is similar to that of *L. Patrisiæ*, Hampe, but the relative size of the series is reversed.

Hookeria Splitgerberi, Mont., is, from the description, evidently another member of this small group, which differs from *Lepidopilum* in wanting the dorsal, medial, and ventral series of leaves.

Hookeria late-virens, Hook. et Tayl., is found in Madeira, and in its pale appearance and size has some resemblance to *L. fontanum*, but the areolation of its leaves, as well as their insertion, is different.

SEMATOPHYLLUM, gen. nov.

Pleurocarpicum. Habitus, fructus peristomiumque *Hypni*.

Folia cellulis alaribus ut plurimum utrinque tribus distinctis signata.

(*Rhaphidorrhynchum*, Schimp.)

S. auricomum, sp. nov. Monoicum, caule prostrato fusco ramis brevibus pinnato, foliis patentibus anguste ellipticis longe subulato-attenuatis concavis enerviis integerrimis, cellulis elongatis angustis, alaribus utrinque tribus fuscis, perichætialibus patentibus e basi subovata sensim angustatis integerrimis breviter nervatis, theca in pedunculo gracili rubro elongato apice cygni colli flexo ovali-cylindracea subinæquali ætate curvata, peristomio dentibus crassis intus valde trabeculatis, processibus carinatis solidis, ciliis binis subæquilongis lævibus.

Hab. Madeira, on decayed wood, *Johnson*.

A small species, closely investing the wood, of a yellow and rather glossy appearance, related to *S. (Hypnum) leptocarpum*, Schw., but much less; allied also to *S. demissum*, Wils.; not, however, very nearly resembling it or any other European moss.

The numerous tropical species belonging to this group are readily distinguished from the *Hypna* and *Stereodontes* by the presence of the enlarged alar cells, which are distinct in form and colour from the rest of the substance of the leaf. Their affinity is remote from *Rhynchostegium*, Schimp., of which his *Rhaphidostegium* was made a section, to include *Hypnum demissum*, Wils.

STEREODON, Brid.

S. canariensis, sp. nov. Dioicus, cæspitosus, caule procumbente pinnatim ramoso, foliis falcatis secundis compressis ovato-lanceolatis ovali-lanceolatisque sensim acutis, marginibus superne argute serrulatis, nervis binis brevibus, cellulis elongatis longitudine circiter $\frac{1}{7000}$ — $\frac{1}{8000}$, latitudine $\frac{1}{8000}$ unciae metientibus, ad angulos paucis obscurioribus, perichætialibus erectis elliptico-lanceolatis apicibus serrulatis, theca in pedunculo elongato gracili brevi ovali inæquali horizontali,

ore magno, operculo conico acuminato, peristomio interno processibus solidis ciliis binis æquilongis in membrana fere ad dentium medium exserta.

Hab. Canaries, *ex Herb. Webb.*; Teneriffe, *Bourgeau, in Herb. Hook.*; Madeira, *Johnson*; Ireland, on Turk Mountain, 1829, *Wilson*.

Nearly resembling *S. cupressiformis*, Brid., in the state called "*mammillatus*," but differing from all states of that variable moss in the sharp serrulation of its leaves and in the size of the cells—about half as long and nearly twice as wide. In some specimens the capsule is very short—not longer than wide.

HYPNUM, *Dill.*

(*Rhynchostegium*, Schimp.)

H. SURRECTUM, sp. nov. Monoicum, caule repente radicante ramis pluribus brevibus pinnatim ramoso, foliis patentibus sursum curvatis surrectis nitidis e basi ovata longe subulato-lanceolatis, nervo medio evanido, marginibus integerrimis in ramulorum apicibus serrulatis, cellulis basi paucis majoribus latioribus superioribus elongatis angustis, perichætialibus subsecundis ovatis subulato-acuminatis subserrulatis nervo brevi, theca in pedunculo brevi lævi ovali horizontali, operculo subulato longirostrato, peristomio interno processibus perforatis, ciliis duobus dimidio brevioribus, in membrana fere ad dentium medium exserta.

Hab. Madeira, on stones, *Johnson*.

A shining green moss, in size resembling *H. confertum*, Dicks., and in the form of its leaves intermediate between it and *H. tenellum*, Dicks. It is remarkable for having all its leaves curved upwards in the same way as those of *H. resupinatum*, Wils.

(*Amblystegium*, Schimp.)

H. MADERENSE, sp. nov. Monoicum, caule repente latissime cæspitoso pinnatim ramoso, foliis patenti-divergentibus e basi subovata sensim subulato-lanceolatis, nervo percurrente, marginibus integerrimis subserrulatisve cellulis oblongo-ellipticis, perichætialibus erectis convolutis ovato-lanceolatis obtusatis nervo excurrente mucronatis plicatis, theca in pedunculo gracili rubro longissimo arcuata cylindracea, operculo convexo apiculato, peristomio interno processibus latis solidis, ciliis binis æquilongis interpositis, in membrana fere ad dentium medium exserta.

Hab. Madeira, on rocks and the earth, *Johnson*, and *Milne in Herb. Hook.*; Canaries, *Montagne*.

This fine species has the habit and appearance of *H. serpens*, Linn., but is in all its parts far larger and more rigid. It grows in extensive patches of a fresh green or, sometimes, brownish

colour; the fruitstalks are about 2 inches long. In the areolation of its leaves it is intermediate between *H. serpens* and *H. varium*, Beauv.

NECKERA, *Hedw.*

(*Homalia*, Brid.)

N. SUBRECTA, sp. nov. Habitu *N. trichomanoidis* simillima, foliis patentibus obovatis basi angustatis apice rotundatis crenulatis apiculo brevi, nervo distincto ad $\frac{3}{4}$ evanido, cellulis minoribus, perichætalibus ovatis acuminatis apicibus denticulatis, theca in pedunculo elongato brevi ovali inclinata, operculo conico-acuminato, peristomio interno processibus perforatis ciliis brevibus rudimentariis interpositis in membrana fere ad dentium medium exserta.

Hab. Madeira, Santa Luzia Levada, about the roots of *Thamnum alopecurum*, Johnson.

Very closely resembling *N. trichomanoides*; but its leaves are scarcely at all curved, the nerve stouter and longer, and the lower portions of the leaves narrowed, so that their figure is uniformly obovate.

LESKEA, *Hedw.*

(*Sciaromium*.)

Caulis primarius repens, radicans; rami erecti, inferne simplices, superne pinnati pendulive prolixique, ramosi. *Folia* rigida, opaca, sublævia, uninervia. *Cellulæ* parvæ, rotundatæ. *Phyllidia* nulla. *Peristomium* normale.

L. SPINOSA, sp. nov. Caule primario repente radicante, ramis erectis rigidis superne ramosis frondem stipitatem formantibus, foliis obscure viridibus rigidis patentibus e basi ovata sensim longe subulatis, nervo crasso concolore in apice evanido, marginibus apice parce remote dentatis alibi integerrimis, cellulis minutis rotundatis longitudine $\frac{1}{2000}$, latitudine $\frac{1}{3000}$ unciae circiter metientibus lævibus.

Hab. Madeira, Johnson and Mason; Azores, Hunt, from Watson.

In all respects very similar to *Hypnum hispidum*, Hook. f. et Wils. Crypt. Antart. t. 61, but more robust, and with leaves having the nerve when closely examined not excurrent but vanishing in the upper portion of the points, which too are dentate. The cells are also rather smaller.

Judging from the specimens, it would appear that well-developed stems would be from 4 to 6 inches high, and less curved than is usual in *H. hispidum*.

L. PROLIXA, sp. nov. Habitu *L. spinosæ* sed graciliore mollioreque, foliis patentibus erectis ovatis acuminatis leniter biplicatis, nervo lato crasso sub apice evanido, marginibus superne indistincte serrulatis,

cellulis parvis ovalibus inter se remotiusculis lævibus, perichætialibus elongatis erectis late lanceolatis acuminatis superne serrulatis, nervo in apice evanido, theca in pedunculo gracili subunciali rubro apice curvato breviter ovali æquali, collo nullo, operculo conico acuminato, peristomio dentibus luteis subulatis, processibus subæquilongis carinatis perforatis, ciliis tribus appendiculatis interpositis in membrana ad $\frac{1}{2}$ dentium longitudinis exserta.

Hab. Madeira, near Funchal, 1857, *Johnson*.

Habit similar to the preceding, but not so rigid nor of so dull a green colour. Ramification less stiff; and some branches are produced as if they had grown in a subpendulous manner. The leaves are not subulate; the nerve wider, and vanishing considerably below the apex.

L. SETIGERA, sp. nov. Habitu *L. spinosæ*, foliis patenti-secundis ovatis concavis, marginibus minute crenulatis, nervo crasso compresso viridi excurrente folii longitudinem triplo superante lævi, cellulis parvis ovoideis basi paucis longioribus.

Hab. Madeira, 1862, *Johnson*.

In aspect entirely similar to *L. spinosa*, but in the few stems yet seen less distinctly pinnate, although forming the same tree-like branches. The great length of the firm and stout green nerve is remarkable.

The species composing this group, and including the *Hypnum hispidum*, Hook. f. et Wils., are here placed as a section of *Leskea*, that being the oldest name under which certain species having the structure and habit of *L. polycarpa*, Ehrh., were distinguished from *Hypnum*, and, like most of the earlier genera, established upon peristomial characters only. But with an extensive series of species it becomes evident that the most perfect form known amongst the mosses having the same areolation and mode of growth is found in *L. tamariscina* (*Thuidium*, Schimper), notwithstanding the apparently different habit and ramification; for in this species the peristome has the same development as in the most complete forms of *Hypnum* and *Bryum*; and diverse as *L. polycarpa* looks in imperfect specimens, when examined in favourable situations it is found to produce occasionally free stems which in ramification and appearance closely resemble *L. abietina* (*Thuidium*, Schimp.); and from this last species the transition into the more branched forms is so easy when even the allied European species are compared, that M. Schimper has not ventured to separate it from his *Thuidium*. And as to the peristome of *Leskea*, taking for example again *L. polycarpa*, it will be observed that it does not differ in structure

from that of *L. tamariscina*, but only in the non-development of those parts of the internal peristome which are present in that species, and that the group of *Leskeæ* with erect capsules and imperfect peristomes is precisely analogous to *Pylaiesia* and *Homalothecium*, Schimp.,—*Pylaiesia* having just the same position with regard to *Stereodon cupressiformis*, Brid., and *Homalothecium* to *Hypnum rutabulum*, Dill. In *Hypnum hispidum* and in *L. proluxa* the peristome is fully developed, and the habit approaches to that of *Thuidium*; but the stems and branches are destitute of the phyllidia so general amongst Leskeoid mosses, and the cells of the leaves are but very slightly papillose. M. C. Müller places *Hypnum hispidum* by the side of *H. fluviatile*, Sw.; but the habit and capsule are different, and the substance of the leaves more rigid. Besides the *H. hispidum*, there is in New Zealand another species belonging to the same group, *Leskea umbrosa*, M.; but little can be said of its habit, for small specimens only have yet been seen. *Hypnum nervosum*, Hooker, and *H. crispulum*, Dzy. et Molk., appear to be possessed of the same habit, but are much less. In time other species may be discovered, which will either confirm the position of the group in *Leskea*, or perhaps show them to be some modification of *Hypnum* with a dense areolation.

HEPATICÆ.

LEJEUNIA, Dumort.

L. JOHNSONIANA, sp. nov. Caule repente vage ramoso, foliis divergentibus orbiculari-ovatis angulo parvo acutis, basi lobulo subsaccato inflexo oblongo apice bidentulo, amphigastriis orbiculari-obovatis integerrimis, perianthio compresso obovato obtuso, ore parvo apiculato, utrinque ala dentata marginata, foliis involueralibus elliptico-oblongis apice paucidentatis, amphigastrio majore obtuso.

Hab. Madeira, creeping on *Madotheca Canariensis*, Nees, Johnson, 1859.

Whole plant brown, about the size of *L. serpyllifolia*, Lib., but agreeing in the form of its perianth with *L. (Phragmicoma) Mackaii*, and thus removed from the vicinity of the species which are allied to *L. subfusca*, Nees, with which it agrees in the form and substance of its leaves as well as in size and colour.

EXPLANATION OF THE PLATES.

PLATE I.

Leskea spinosa. Plant, natural size; leaf, magnified.

Leskea proluxa. *a*, Plants, natural size. *b*, Leaf; *c*, perichaetial leaf; *d*, capsule; *e*, portion of peristome: all magnified.

Leskea setigera. Plant, natural size; leaf, magnified.

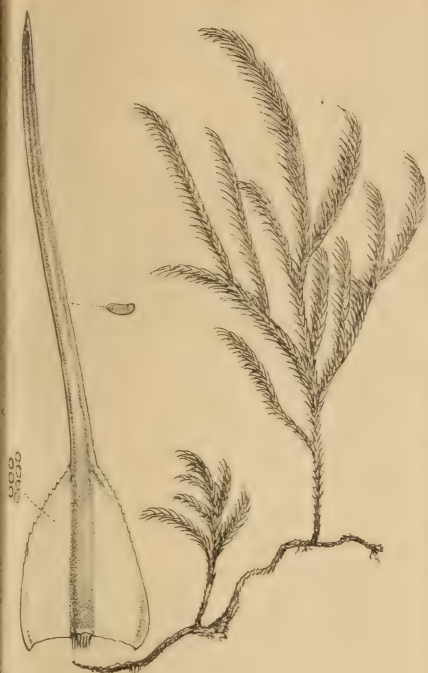
PLATE II.

Sematophyllum auricomum. *a*, Plant, natural size. *b*, Leaf; *c*, perichætium and male flower; *d*, capsule; *e*, portion of peristome: all magnified.

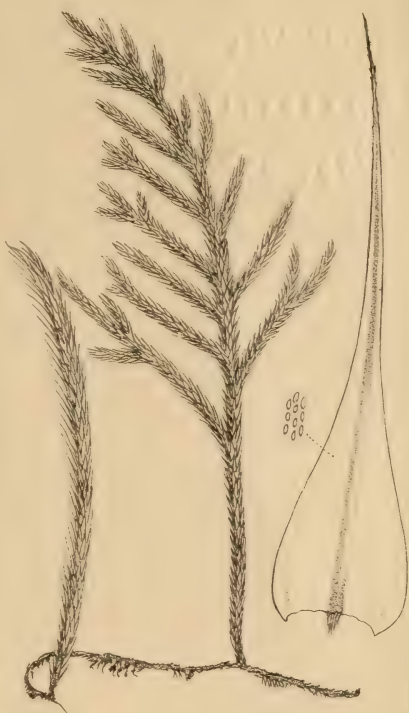
Hypnum surrectum. *a*, Plant, natural size. *b*, Leaves; *c*, perichætium and male flower; *d*, capsule; *e*, portion of peristome: all magnified.

Lejeunia Johnsoniana. *a*, Plant, natural size. *b*, Portion of stem with leaves and stipules; *c*, involucreal leaf detached; *d*, perianth, with involucreal leaves and stipule; *e*, transverse section of perianth.

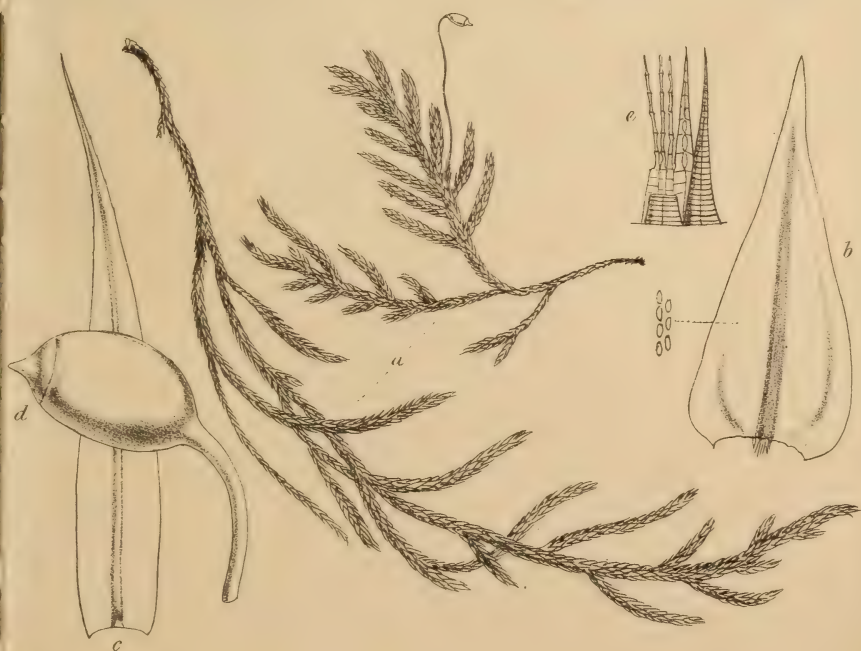




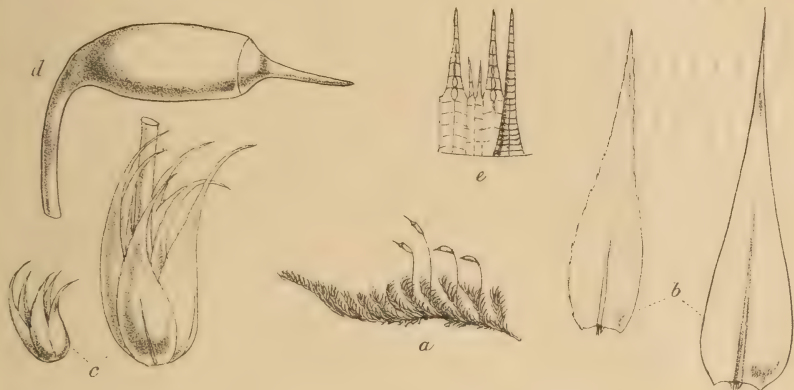
L. setigera.



Leskea spinosa



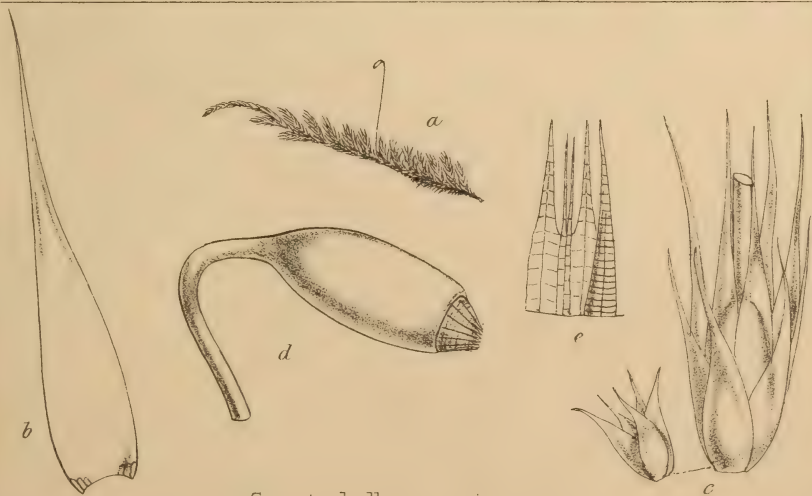
L. proluxa.



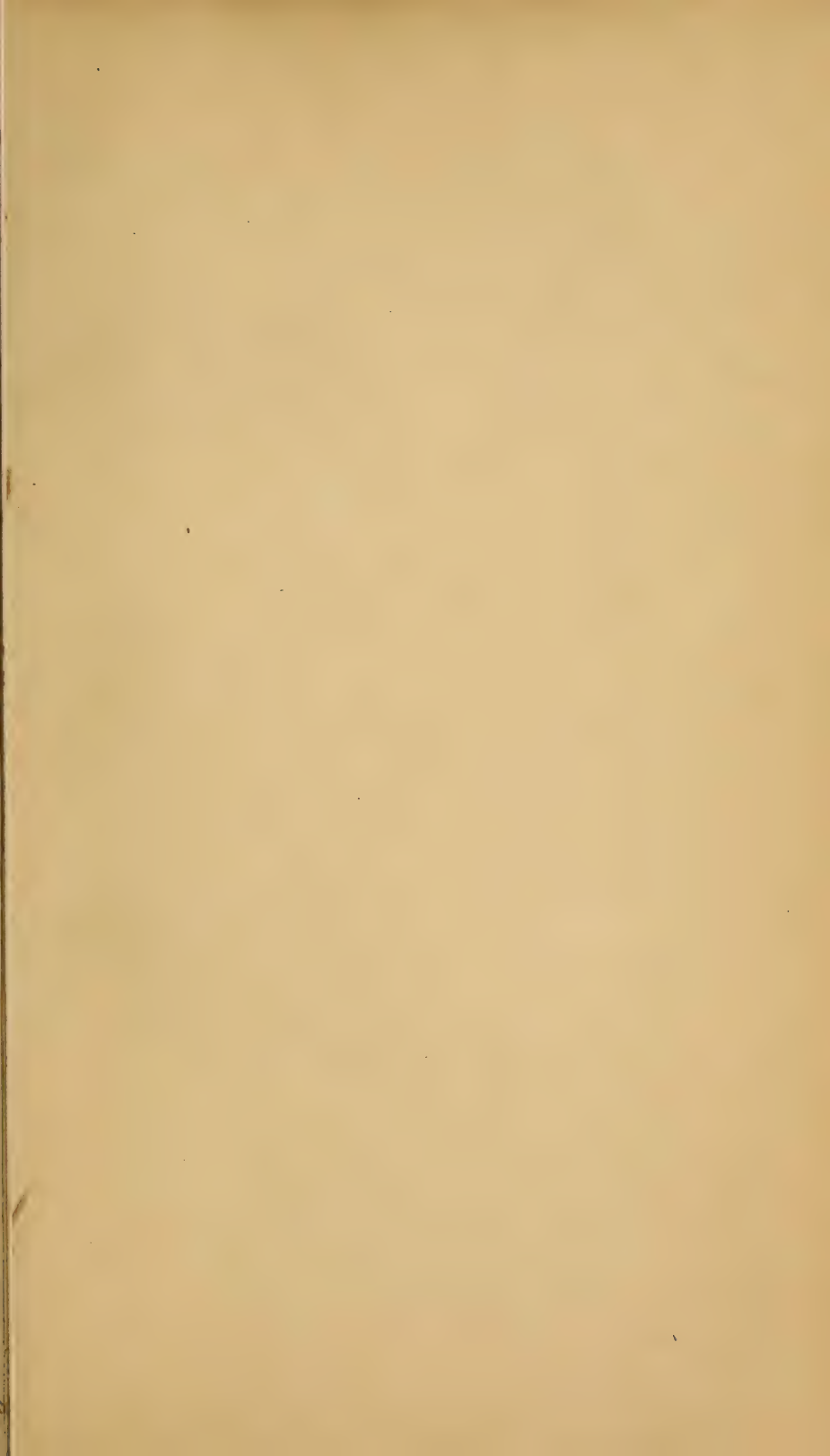
Hypnum surrectum.

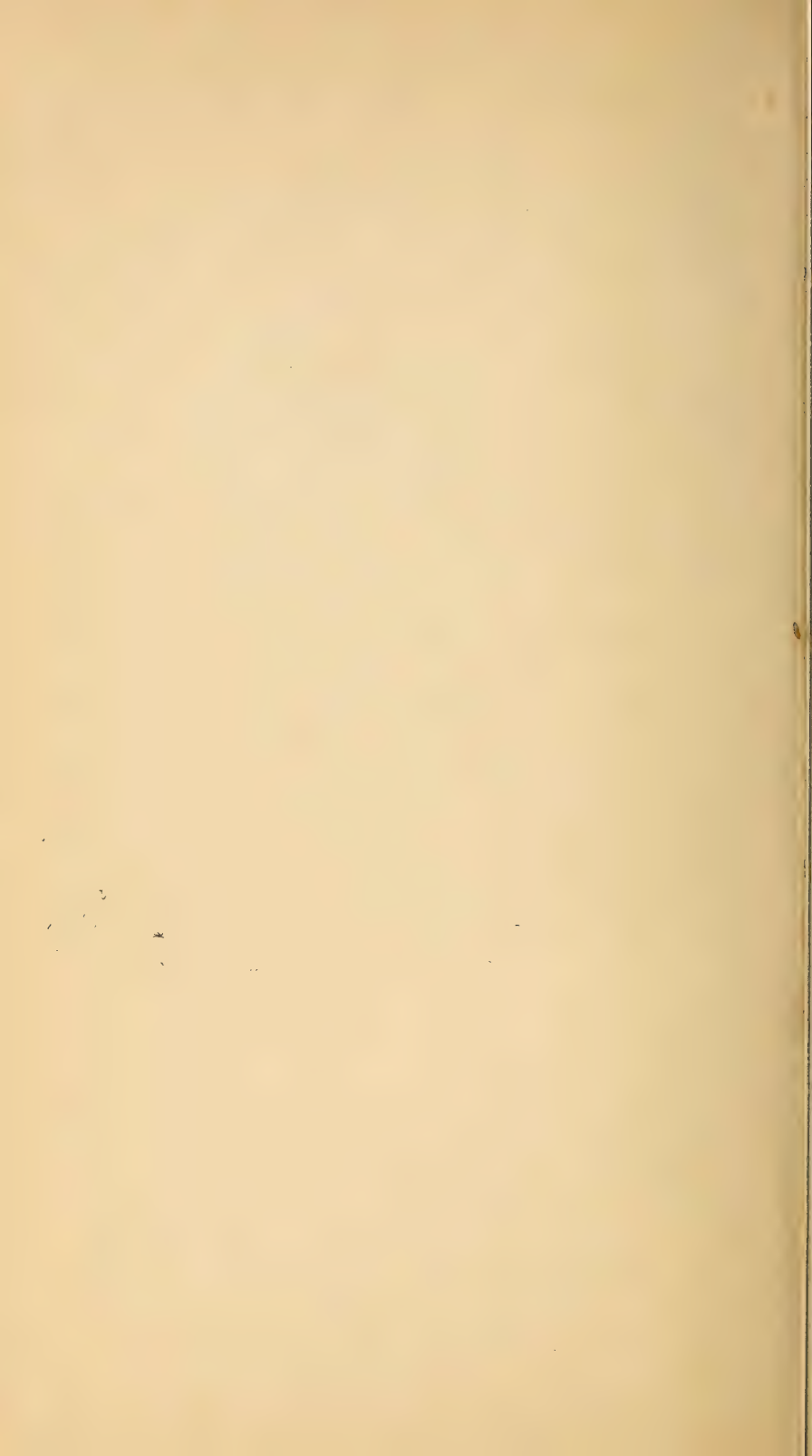


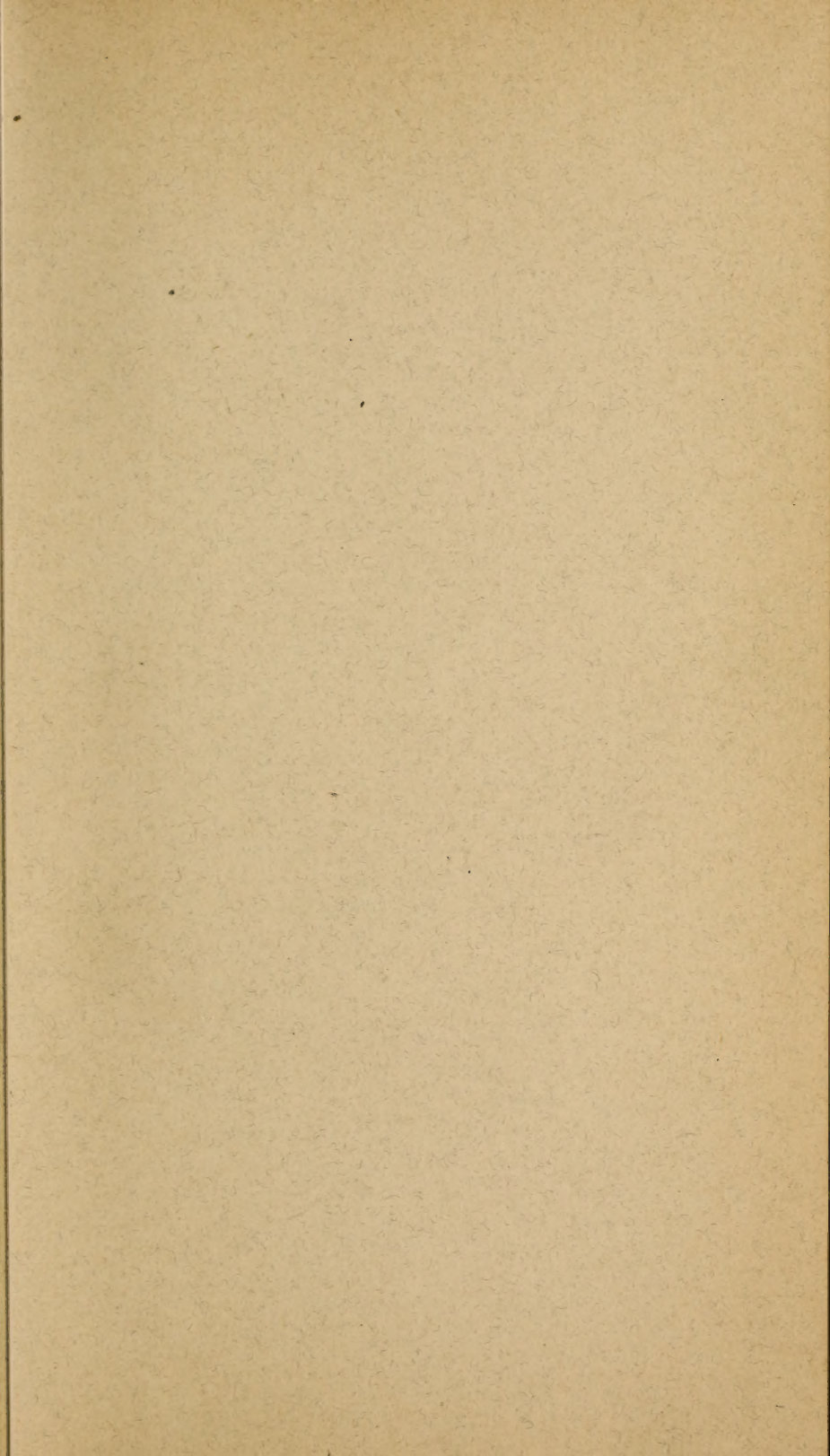
Lejeunia Johnsoniana.

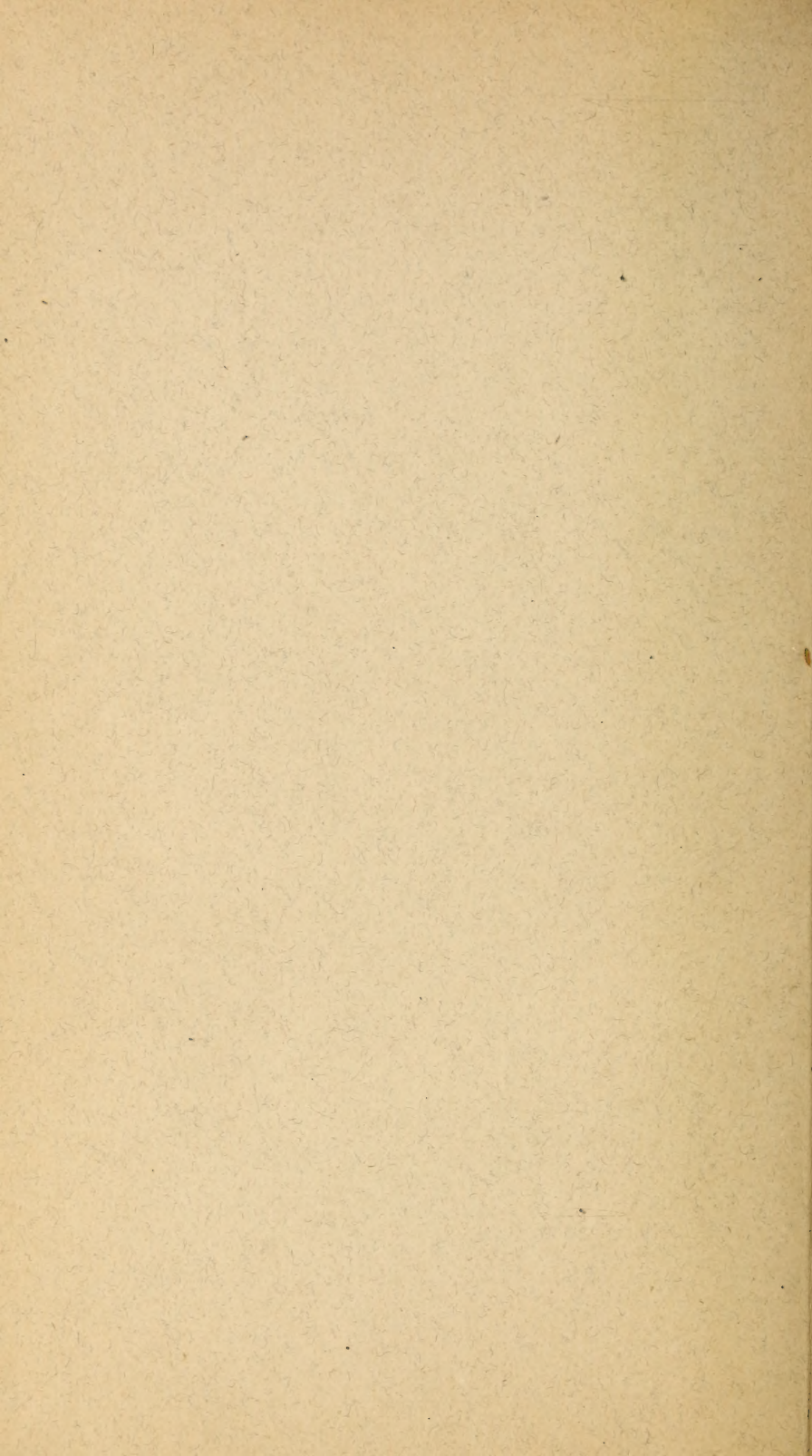


Sematophyllum auricomum.









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